GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

Manufacturing ***DETAILS*** *make* ***PERFECTION***

IN EMCO DOMESTIC METERS

Perfection in design must be supported by perfection in manufacture. The task of producing a mechanical product, such as a meter, which meets the approval of both the designer and user oftentimes requires more ingenuity than the initial engineering work in designing. The proper factory methods, machines, tool accessories and inspection procedure are all highly important steps in building a quality product.

The production of EMCO Meters today is based on a thorough-going and carefully planned manufacturing procedure. No effort has been spared to take a well proven design and evolve a meter which in terms of service lives up to its engineering promise.

PITTSBURGH EQUITABLE METER COMPANY

MERCO NORDSTROM VALVE CO.

NEW YORK · BUFFALO · PHILADELPHIA
KANSAS CITY · TULSA · LOS ANGELES

Main Offices - PITTSBURGH, PA.

DES MOINES · CHICAGO · COLUMBIA
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AUGUST 1939 ◆ ◆ 25 CENTS

YOU *can* keep a good pipe down! Witness several cities with cast iron distribution mains in service that were laid a century ago, equalling in life the gas industry itself. Today's cast iron pipe is an even better product. Today's *mechanical joint* cast iron pipe makes a permanent, swiftly-assembled, *bottle-tight* line under modern operating conditions. All mechanical joints, made by CIPRA members, are based on the stuffing-box principle.

Look for the "O-Check" registered trade mark. Cast iron pipe is made in diameters from 1¼ to 84 inches.

THE CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1013 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

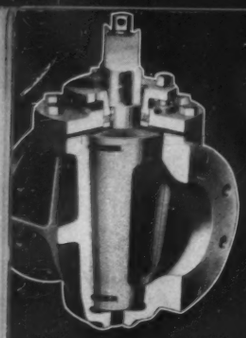
For 103 years this cast iron gas main has served the City of Boston. It was recently uncovered for inspection and here it is—good as new.

Just one tool! A ratchet wrench and common labor are all you need to assemble the time-tried and proved bottle-tight mechanical joint.

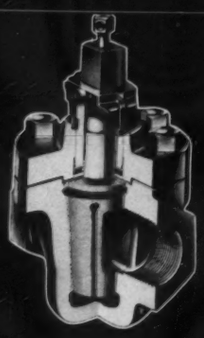
. . . Not a Leak in an Ocean

Terminating in the briny Pacific, almost a half mile from the California shore, a 16″ pipe-line carries crude oil to deep water to load tankers. Drastic laws warn against contamination of the water. A tight shut-off was imperative. Corrosion had to be thwarted, too. Valves with exposed, threaded stems were inadequate. Only a Nordstrom Lubricated Valve could serve the need—and it has served for years. It provides an absolutely *blind* ending for the 12″ flexible hose which connects to the 16″ submerged oil line. Not a drop of oil can leak out; not a drop of salt water can intrude. The hydraulic seal of lubricant which completely envelops the plug ("Sealdport" patent) makes the Nordstrom Valve *impervious* to leaks—regardless of line contents—for oil, gas, air or chemicals. It's the *all-purpose* valve for *your* service.

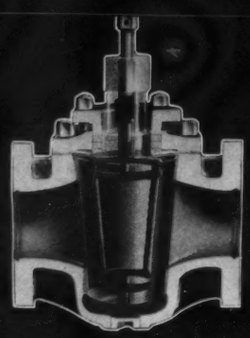
NORDSTROM VALVES



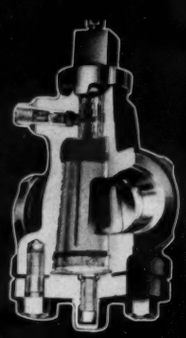
MCO-NORDSTROM TYPE



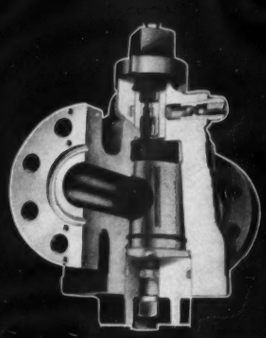
NORDCO STEEL TYPE



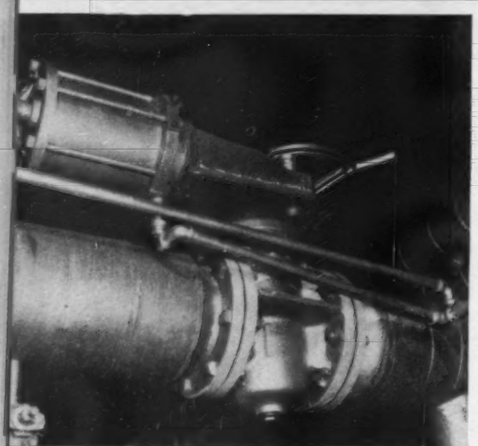
STANDARD TYPE



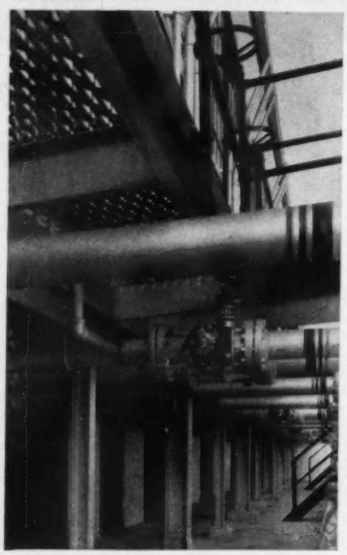
HYPRESEAL TYPE



Round Opening HYPRESEAL TYPE



Nordstrom 10" Valve, hydraulically-operated, in butane stand-by plant in California.



Nordstrom Valves on natural gasoline compressor discharges. Note handwheels mounted above walk-way for control from upper level.

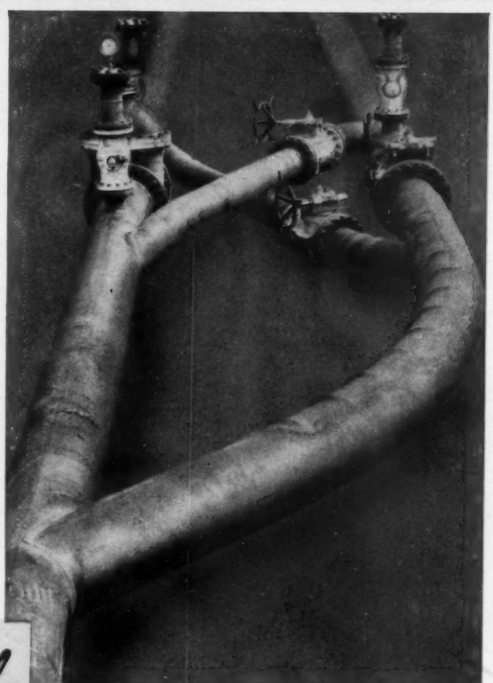
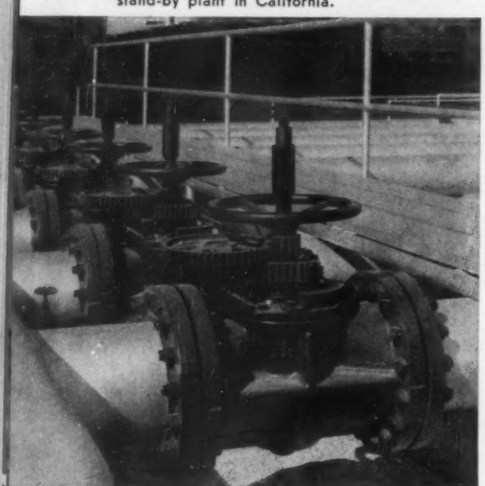


Photo shows unique arrangement of welded gas pipe installed in Wyoming on an 18" loop line. Also shows wrinkle bending both in the 18" loop line and 10" cross-over lines. Nordstrom Valves are used.



Nordstrom Valves on gas lines in a California metering station.

Permanently Leak-Proof!

MERCO NORDSTROM VALVE CO.

A Subsidiary of PITTSBURGH EQUITABLE METER CO.

WORLD'S LARGEST MANUFACTURERS OF LUBRICATED PLUG VALVES; GASOLINE, OIL & GREASE METERS

Branches: *Main Offices:* 400 Lexington Ave., PITTSBURGH, PENNA.

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PRODUCTS: Nordstrom Plug Valves • Nordstrom Air, Curb and Meter Cocks • Nordstrom Valve Lubricants • EMCO Gas Meters • EMCO-McGaughy Integrators • EMCO Regulators • Pittsburgh Meters for Gasoline, Grease, Oil, Water and other Liquids • Raybould Couplings • Stupakoff Bottom Hole Gauges

NORDSTROM VALVES

WITH PATENTED "SEALDPORT" LUBRICATION

Only Nordstroms meet every major valve need

GET ALL FOUR!

SIMPLICITY—unskilled labor assembles standard parts on plain-end pipe, using only a wrench.

SPEED—typical examples: 5 minutes for 8″; 8 minutes for 14″; 12 minutes for 20″ (two workmen).

FLEXIBILITY—expansion and other pipe movements absorbed; curves with straight pipe.

TIGHTNESS—The only flexible joint with a 50-year, proved record of permanent tightness.

Another pipe-line builder (22 miles of 10″ natural-gas line in central New York State) gets Simplicity, Speed, Flexibility, and Tightness in his pipe joints! His use of Dressers with ALL FOUR gave him faster construction, lowered costs, and completely satisfactory results. ●*Only Dressers Give You ALL FOUR!*

DRESSER PIPE COUPLINGS

DRESSER MFG. CO., BRADFORD, PA. Offices at New York, Chicago, Houston, and San Francisco. *In Canada:* Dresser Mfg. Co., Ltd., 60 Front St., W., Toronto, Ont.

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GAS

Fifteenth Year of Publication

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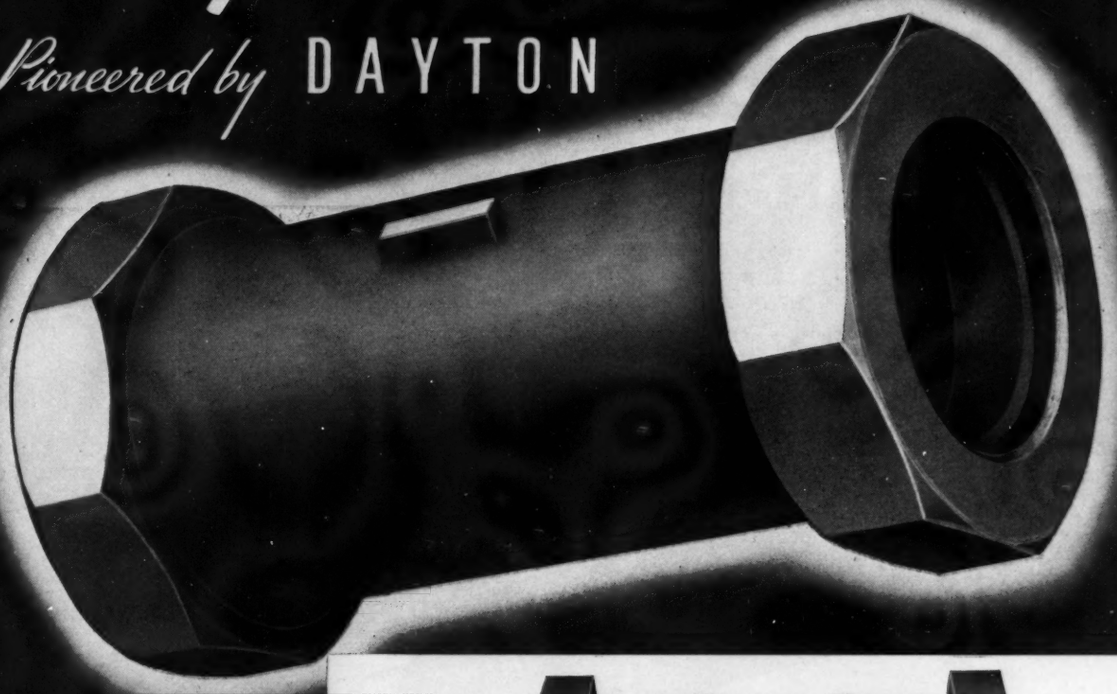
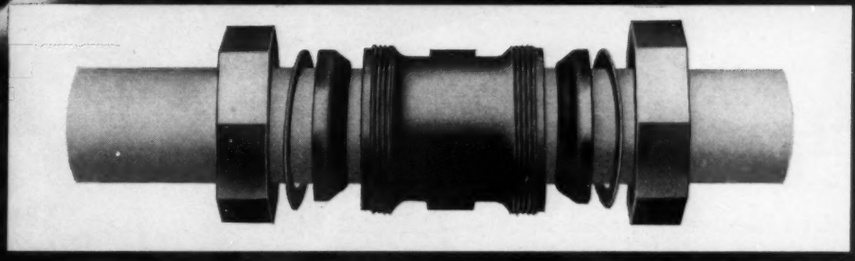
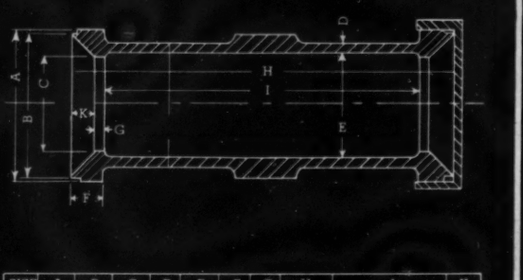
The *Dayton* BOLTLESS COUPLING

Pioneered by DAYTON







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.75	1.812	1.687	1.125	.125	1.312	.437	.125	3	5	10	2.250	4.250	9.250	.250
1.0	2.062	1.937	1.437	.125	1.562	.437	.125	3	5	10	2.250	4.250	9.250	.250
1¼	2.437	2.312	1.750	.125	1.937	.437	.125	3	5	10	2.188	4.188	9.188	.281
1½	2.750	2.625	2.00	.125	2.125	.500	.125	3	5	10	2.125	4.125	9.125	.312
2.0	3.437	3.312	2.469	.156	2.625	.500	.125	3	5	10	1.906	3.906	8.906	.422

SIMPLICITY in design, construction, and application features Dayton Boltless Couplings.

One man, with a common wrench, can quickly and economically produce a flexible and permanently tight joint at the minimum expense.

The same type of gasket is used as is employed in the larger types of Dayton Couplings.

Construction is entirely of malleable, assuring maximum resistance to corrosion—as an added precaution they are Bonderized and painted.

Table at left gives full range of sizes.

THE NATIONAL SUPPLY COMPANY

DAYTON COUPLING DIVISION

TOLEDO, OHIO

STOP and GO

OPERATION IS HARD ON THE F.O.T.†, TOO

†Cost of Fuel + Oil—Tar removed.

BUT SEE WHAT THIS SEMET-SOLVAY REVERSE FLOW WATER GAS MACHINE DID ON FOUR SHUTDOWNS PER DAY!

A TYPICAL DAY'S OPERATION

Total operating time	13.56 hours
B.T.U.	535
Fuel per M C F	13.3 lbs. coke
Oil per M C F, 4.85 gal. Heavy Bunker C	
Tar Removed per M C F*	1.179 gal.

AVERAGES FOR MAY

Fuel per M C F	13.30 lbs. coke
Oil per M C F, 4.85 gal. Heavy Bunker C	
Tar Removed per M C F*	1.172 gal.
B.T.U.	534
Average make per hr.**	133,018 cu. ft.
Reforming	32.5%

*Tar figured at 32% of enriching oil.
**Not pushing machine. Has made as high as 155,000 per hr.

PICTURED ABOVE is an actual operating time chart of a Semet-Solvay Reverse Flow Water Gas Machine located in New England. Four shutdown periods per day are certainly not conducive to the most efficient operation, yet notice that the FOT compares favorably with that of most water gas machines operating under far more favorable conditions!

Can *your* water gas machine match these results? Regardless of what fuel or what quality of carbureting oil best serves your needs, the chances are that the Semet-Solvay Reverse Flow principle can save you money, whether applied in a new machine or through modernization of your old machine. Why not write today for further information?

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ENGINEERING CORPORATION

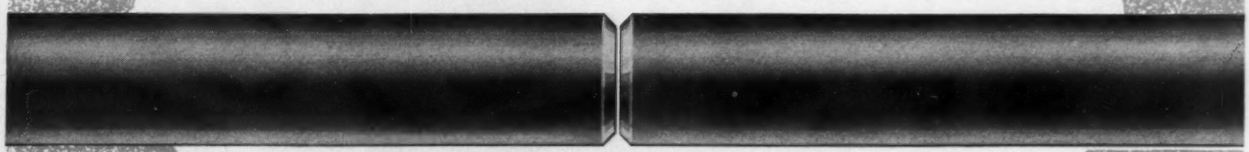
Engineers *Contractors*

SEMET-SOLVAY ENGINEERING CORP. WE SELL SOLUTIONS TO HEAVY PROBLEMS NEW YORK

40 RECTOR ST. NEW YORK, N. Y.

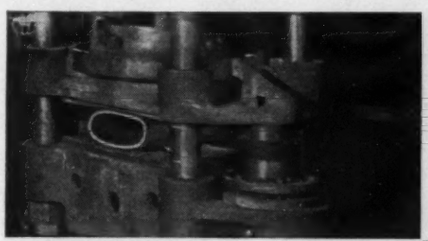
PIPE ALIGNMENT IS IMPORTANT-

when pipe lines must be completed on schedule

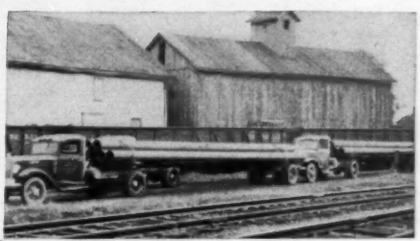


The uniform roundness of Republic Electric Weld Line Pipe is a time-saving factor in construction. The ends of adjoining lengths butt perfectly and save welding time.

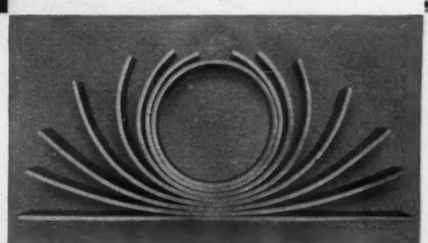
AND EQUALLY IMPORTANT ARE THESE 6 FEATURES



Uniform Wall Thickness—Because this pipe is formed from carefully-selected, flat-rolled steel of uniform gauge, every part of the finished pipe wall is the same thickness. No thin or heavy spots to slow up the welder. No uncertain welds at joints.

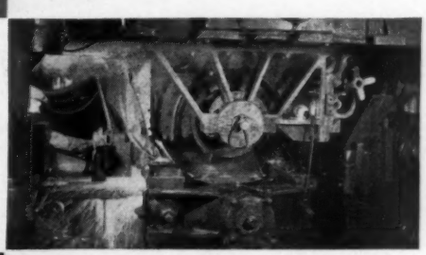


Sound Weld—This crushing test on a section cut from every length of Republic Line Pipe must show a break in the wall and not at the weld. Safe, sound, electric resistance welds do not open during field bending, save duplication of effort and speed up construction.

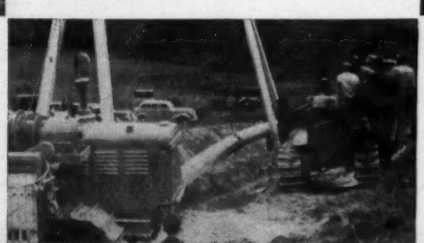


Long Lengths—It is axiomatic that in any line, the longer the lengths the fewer the joints to be welded or coupled, and the lower the cost on this item of construction. Fifty-foot lengths or longer are easy to produce in the Republic plant.

Ductility—In rough terrain where many bends must be made without shop equipment, the ductility of Republic Line Pipe assumes a high degree of importance. Uniform ductility means accurate bends, easier bending, less strain on equipment—and time saved.



Straightness—These straightening rolls insure the highest possible degree of uniform straightness. This means that ends will be parallel and, therefore, easy to butt all around, again saving the welder's time and speeding up construction.



Delivery Facilities—Through this house-high machine, 40,000 tons of line pipe can pass and be welded every month. With such facilities, construction schedules on even the longest main-line job can move smoothly to completion. Simply specify Republic Electric Weld Line Pipe.

REG. U. S. PAT. OFF.

REPUBLIC STEEL

REPUBLIC LINE PIPE

REPUBLIC STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, O.

UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY
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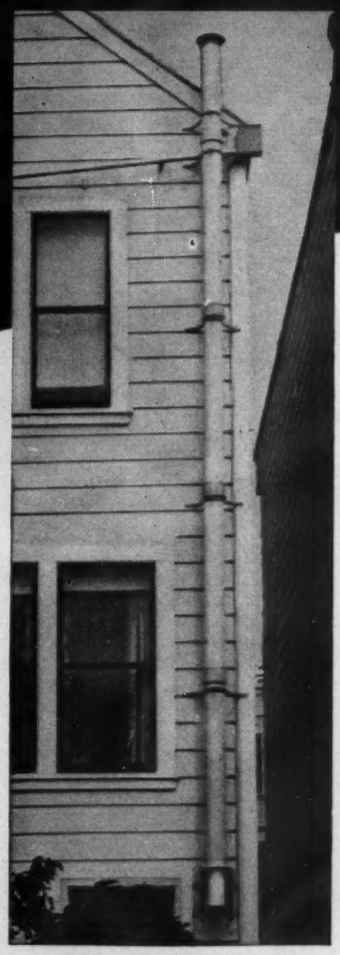
SAVE ON SERVICING
with this DURABLE FLUE PIPE

EASY TO HANDLE, J-M Transite Flue Pipe keeps jobs moving fast. A complete line of fittings, a full range of sizes in both round and oval form make installation simple and economical . . . even in restricted working quarters.



ASBESTOS-CEMENT in composition, J-M Transite Flue Pipe is completely fireproof, unusually resistant to corrosion. Wherever used, it minimizes costly repairs and replacements . . . helps keep customers sold on gas for the "four big jobs."

Strong, fireproof, corrosion-resistant, J-M Transite Flue Pipe adds extra dependability to gas on the "4 big jobs" . . . assures low maintenance costs

When you sell gas appliances for heating, cooking, refrigeration and hot water, you can rightly promise greater convenience and reliability. To back up that promise, all equipment must be as nearly troubleproof and maintenance-free as possible. And that's why more and more gas companies are specifying J-M Transite Flue Pipe for venting systems.

This modern vent pipe offers advantages that home owners appreciate. It is made of asbestos and cement, 100% fireproof. Its high corrosion-resistance helps keep maintenance low. Installations are easily and economically completed, even in cramped working areas. And the finished job is neat and attractive . . . never needs paint for preservation.

The facts will show you how and why Transite Flue Pipe assures economical venting . . . cuts out many service calls that would ordinarily reduce your profit margin. An interesting new brochure gives full details. For your free copy, write Johns-Manville, 22 East 40th Street, New York, N. Y.

AT THE NEW YORK WORLD'S FAIR . . . don't miss the Johns-Manville building. And be sure to see the interesting use of J-M Transite Flue Pipe in the American Gas Association Building.

JM PRODUCTS

Johns-Manville TRANSITE FLUE PIPE

★COMPLETING OUR LINE OF SERVICE CONNECTIONS

SKINNER-SEAL
SERVICE SADDLE

THE STANDARD OF THE INDUSTRY

NEW!

SKINNER-SEAL
NON-SHIFT SERVICE SADDLE

CAN'T SHIFT OR TILT

NEW!

SKINNER-SEAL
FORGED WELDING TEE

A FORGING FOR WELDING SERVICES

NEW!

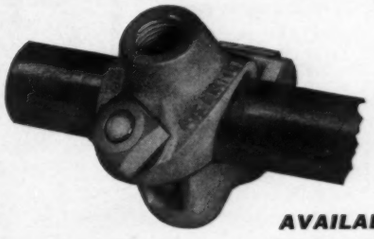
SKINNER-SEAL
FABRICATED TEE
WITH CHECK VALVE IN DRILL OPENING

NEW!

SKINNER-SEAL
DRILLING DEVICE

FOR DRILLING MAINS WITH ALL TYPES OF SERVICE CONNECTIONS

SKINNER-SEAL SADDLE TEE



AVAILABLE WITH "TAMPER-PROOF" BOLT

SEND FOR BLUEPRINTS ON NEW ITEMS – ALSO REGULAR CATALOG

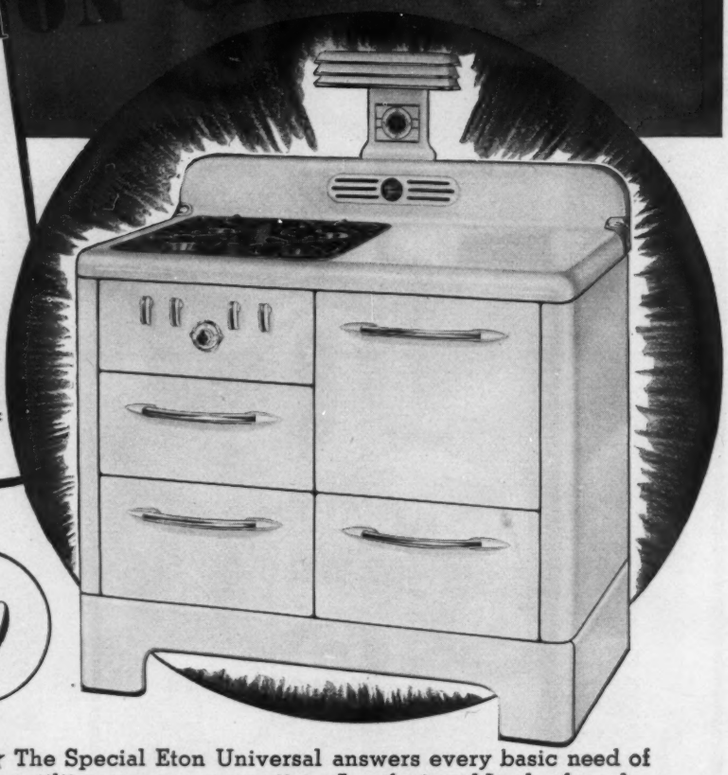
M. B. SKINNER CO. *Est. 1898* **SOUTH BEND, IND.**

A Range that answers every basic need of Gas Utility Promotion..

15 OUTSTANDING FEATURES— SPECIAL ETON UNIVERSAL

These New and Advanced Devices Guarantee Cooking Success

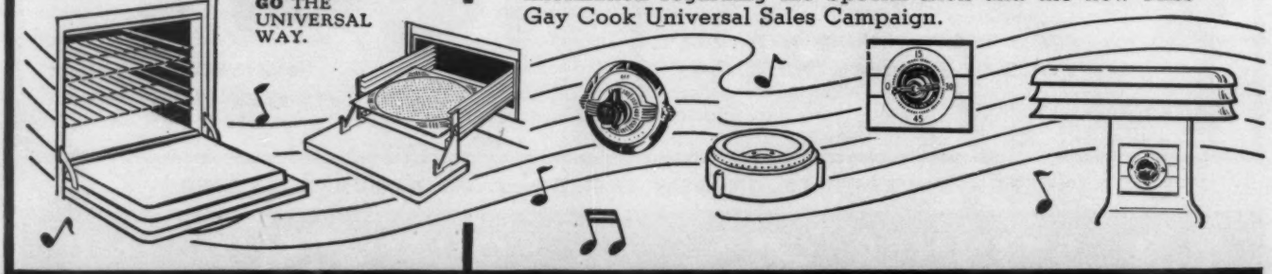
1. Modern Range Lamp
2. Minute Minder—notifies the cook when cooking is done.
3. One Giant and Three Standard Self-Lighting Simmer-Save Burners.
4. Porcelain Thriftop and Thrift Grates.
5. Automatic Oven Heat Control.
6. Two Service Drawers.
7. Savory Smoke-proof Broiler Grid with Chrome Broiler Pan.
8. In-A-Drawer Broiler.
9. Rigid Durable Sky-scraper Construction.
10. High Speed Low Temperature Precision Oven Burner.
11. Ribbon Bar Oven Racks with Stop Catch.
12. Draftless Precision Bake Oven—gives perfect heat distribution.
13. Heavily Insulated Oven—greater comfort.
14. All Porcelain Enamel Inside and Out.
15. One-Piece Monitor Top.



Universal introduces a new character to the gas range Sales Campaign field—Miss Gay Cook, who offers sage advice via the rhyme route.

INTRODUCING MISS GAY COOK...
WHO SAYS, "PUT THIS IN THE BOOK"
GAS FOR FUEL IS PERFECTION.
WE SUBMIT FOR YOUR INSPECTION
RANGES MODERN AS TOMORROW.
IF ADVICE YOU WISH TO BORROW
STOP AND SHOP THIS VERY DAY
GO THE UNIVERSAL WAY.

★ The Special Eton Universal answers every basic need of gas utility gas range promotion. As a featured leader for sales campaign purposes, the Special Eton offers the ideal sales combination—it is "tops" in cooking performance as well as "tops" in value. As a sales background for the Eton, Universal has created a new and unique Sales Campaign which is bound to attract attention, create interest and stimulate action on the part of the consumer. Broadsides, newspaper ads, special letterheads, envelope enclosures, window banners, letter stickers—Universal presents a complete, unified sales program that will produce results. Write or wire for complete information regarding the Special Eton and the new Miss Gay Cook Universal Sales Campaign.



UNIVERSAL GAS RANGES

Cribben & Sexton Co. · 700 N. Sacramento Blvd. · Chicago

GAS
AUGUST, 1939

GUEST Editorial

Home Service Extends
AN INVITATION

By GLADYS B. PRICE
Chairman, Home Service Committee,
American Gas Association

TO paraphrase the old saying, "Now is the time for all good gas men and women to come to the aid of their home service department." This woman's viewpoint is that every home service worker should somehow get to Los Angeles for the third annual Home Service Conference, to be held August 22-26, at the Chapman Park Hotel.

The purpose of this Conference is two-fold. First, to interest teachers and students of home economics in the performance of new equipment. Second, it affords an opportunity for home service women to discuss their mutual problems and to hear nationally known sales executives. If the gas industry, as a whole, were familiar with the work which is done at this Conference, they would be whole-heartedly enthusiastic in its support. If we are to put over the story of the modernity of gas appliances, it seems logical that we should begin with the home economics teachers, whose job it is to give girls the only technical training which they ever receive in homemaking. A general survey of the gas equipment in the public schools of your territory will very quickly convince you of the need of education along this line.

How can this be accomplished unless the teachers have the opportunity of seeing modern gas appliances demonstrated and to be sold on the plus advantages of the latest equipment? These teachers are also training girls who will likewise go out to teach home economics. Since it is the teachers' job to help raise the standards of living and to train girls to become better homemakers, home service is trying to cooperate by giving them an opportunity to meet with us and to help them with their problems.

For the past several years, it has become increasingly difficult to get the right sort of home-economics trained girl for home service work. This is extremely important to the gas industry. We feel, therefore, that through this Conference we can encourage college home economics professors to include more equipment courses which will give their graduate students a better background for utility home service work.

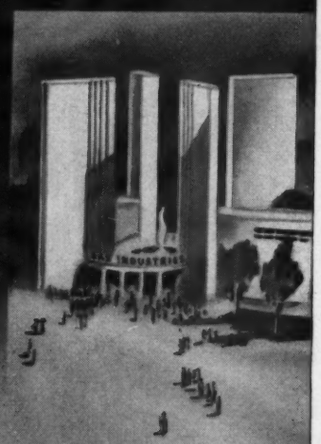
This is our first, and probably our only opportunity, of having this Conference on the West Coast. I feel that it offers to gas companies a distinct privilege, as well as a duty, to support a training course such as this.

The program which has been planned includes many talks which will be of interest to everybody connected with the gas industry, as well as actual demonstrations of gas equipment, to be given in the new Hollywood and Beverly Hills auditoriums of the Southern California Gas Company. A glance at the complete program on page 44 of this issue should convince sales executives and home service women that they will really be missing something if they don't attend. Advance registrations indicate a good attendance and that we shall have a representative from Washington, D. C., as well as one from Honolulu, certainly representing East and West.

A special effort has been made to make this Conference attractive from the social standpoint, as well as the educational. Since the Dietetic Association Convention is to be held the following week at the Ambassador Hotel, there will be a number of representatives from the larger food companies and magazines, who will attend both Conventions.

Home Service cordially invites sales executives and appliance manufacturers to attend the Conference.

PUBLIC RELATIONS *in YOUR industry*



● George Rector, official host at the Gas Industries Building of the New York World's Fair, is a persuasive promoter for the wider popular use of today's gas-burning appliances.

Every gas company, too, has an unequaled opportunity to play the "host" and gain the confidence of a wider circle of customers . . . as a result of the tremendous sales-producing influence of the Gas Industry exhibits and of the educational work at the great New York and Golden Gate expositions.

Building up loads on an efficient, lastingly satisfactory basis, implies the use of the most modern gas measuring instruments. The gas measurement engineers of American Meter Company—in providing dependably accurate instruments such as **AMERICAN** Tinned Steelcase Meters, **METRIC-AMERICAN** Ironcase Meters and **RELIANCE-AMERICAN** Regulators—give you effective cooperation on your public relations job. They help you win and *hold* your customers' good-will. Consult our Catalog **TG-4** (new edition) and Catalog **EG-40**.

FACTS EVERY GAS MAN SHOULD KNOW . . .

- $5,000,000,000 approximate total investment represented by U.S.A. gas companies! ($4,200,000,000 is the investment figure for Steel.)
- Gas Industry capital investment of $37,000 for every employee. ($25,000 for Railroads; $7,000 for Steel; $3,000 for the Automotive Industries.)
- Total annual payroll of over $213,000,000 for the Gas Industry's 135,000 employees—$1,575 per employee. (Exceeds very substantially the average annual wage in the Automotive and Steel industries.)
- Gas Industry's 48-hour week in 1929 reduced to 40 hours by 1936—yet the 1936 average annual wage per employee was slightly higher.
- 40¢ paid Government by the Gas Industry in taxes, for every dollar paid in wages.

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AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

1196

THERMALLY *Thinking*

Questions

As we write, this is one of those hot, stuffy days, and we would much rather ask questions than try to answer them. So here goes:

Are we pretty well stymied in the alleged summer air-conditioning field until we have available gas equipment to match the portable electric jobs for individual bedrooms and offices?

If the British can do a high-class modern gas street lighting and flood-lighting job, why can't we?

Why do investment counsellors feel that straight gas securities dilute a portfolio, whereas in reality they strengthen it?

But we'd better stop. It's too hot a day for more embarrassing questions.

Research

"Research" like "service" is one of those words that has slipped from grace through overwork and misuse. And so many of us are talking about it these days that it might be a good idea to do some defining to clarify our thoughts. The editorial dictionary defines "research" as "endeavor to discover facts by scientific study of a subject, a course of critical investigation."

There is considerable research of a particular kind going on continually in the gas industry, for every reputable gas appliance or equipment manufacturer maintains his own research department. His objective is to better his products and their production. Ofttimes this leads him into many unexplored fields with sometimes startling results, but, because he is a manufacturer with corporate responsibilities, the scope of his research is rightly limited by the practicability and salability of the results. In other words, the manufacturer being a practical business man has to remember on which side his bread is buttered.

What might be defined a pure research, that is, the scientific study of gas to discover new facts about its generation, distributon and utilization, is something else again, and it is something that properly belongs with the gas companies themselves. However. rather than see it conducted in hundreds of companies each working independently of the other and perhaps duplicating their efforts in many instances, the suggestion seems logical that it be pooled through the A.G.A. and the necessary organization set up to conduct it. Where shall we start and correlated questions are ones that must be answered by the industry itself.

Off the bat, it can be assumed that appliance research is in competent hands where it is at present. The manufacturers have proved their merit with the CP range and the forthcoming CP water heater. Any proposed research by the A.G.A. should be limited to those subjects which are not at present being covered so adequately by the appliance manufacturers.

It has been suggested that the A.G.A. Laboratory is the logical focal point for such an activity. It is. There have been strong objections raised, but wouldn't most of those objections be withdrawn if the scope of the proposed research were clearly defined and the danger of needless duplication eliminated?

The need for specific research is chronic, and surely some way can be found to straighten out our internal kinks, in order that its obvious benefits can be made available as soon as possible.

Space Heating

In our July issue article No. 5 of our "mass" market series, by Stanley Jenks, dealt with the subject of direct space heating in manufactured gas territories. The author, if you remember, suggested that a direct space heating load is obtainable from the lower income group customers, as proved by some New England manufactured gas companies, because it is economically practical.

Startling confirmation of Mr. Jenks' article came to the editorial desk and appears in this issue on page 22. Messrs. Arthur M. Apmann and C. E. Little of The Derby Gas and Electric Co. in "Direct Space Heating is Satisfactory and More Economical" describe their favorable experiences with this type of space heating in their territory, and encouraged by the results obtained so far, feel they have opened up a brand new load source, otherwise competitively unobtainable.

Mr. Apmann's reputation in the gas heating field is no humble one. Years ago, with the former Consolidated Gas Co., New York, he was a gas conversion burner pioneer in manufactured gas circles.

Those who know him, know him as a forthright speaker and an original thinker, whose restless mind refuses to be satisfied with "as is" conditions. Naturally, he is enthusiastic about the results Mr. Little and he describe.

The point is, if direct space heating has proven so successful and economical in Derby, Conn., why shouldn't it click equally well elsewhere, if it is sponsored as enthusiastically, sold correctly and engineered soundly? There is plenty of excellent direct space heating equipment available.

We feel that direct heating, on the facts available, merits the serious consideration of every manufactured gas sales executive, who cannot have too many armaments available to fight his competition in today's intense battle of the fuels, especially those competitors which are so much more deeply entrenched than gas.

As Others See Us

This column has a favorite saying to the effect that it is not what we know but what our customers think that counts.

We confess we were somewhat shocked rather than surprised when we read the following in a weekly review of business forecasts dated June 21 and sent out by a New York stock brokerage house.

> STANDARD STATISTICS Trade and Securities Business Prospect dated June 16 reviews the public relations problems of the utility industry, emphasizing the necessity of some concerted effort on the part of the individual companies to foster good will. The utility companies have suffered in recent years from the public's willingness to follow the political hostility to the industry, and there is a greater realization on the part of the company executives that future earnings depend on a satisfactory tax and rate structure . . . The extent to which a deliberate policy of cultivating consumer good will can offset the present unsatisfactory status is doubtful, but it is plain that the problem is one that ultimately rests with the voters, and there appears to be no alternative to a program of public conciliation. The Bell Telephone System is the outstanding example of a monopoly company deliberately cultivating consumer good will, with a highly successful record over a long period of years. The electric utility industry is handicapped to some extent by the fact that contacts with customers are much less direct and continuous, but a determined attempt to improve the standing of each company in its own community will eventually provide beneficial results.

After reading that, the average utility operator, we feel, will be inclined to scratch his head in utter bewilderment and plaintively ask "What the hell?" or its more or less equivalent.

But facts are facts, and when a well-informed group like Standard Statistics is apparently unaware of our local efforts to correct the thinking of our politically misinformed customers, it is obvious that we still have a long way to go, in our efforts to gain the sincere goodwill of our customers.

In public relations, it is axiomatic that actions speak louder than words, and one of our vulnerabilities has always been our customer contacts down the line of our organization. A snippy adjustment clerk, an untidy boorish fitter, a high pressure salesman, or a discourteous cashier can do more damage in five minutes than the sincere statements of higher-ups can rectify in a year.

Every gas company employe, the minute he speaks to a customer as such, becomes the official voice of the gas company. Accordingly, many gas companies for years have recognized that the real foundation for a successful public relations activity is the proper selection and adequate training of employes to meet the public. And this, in the final analysis, boils itself down to the fact that a well-managed, work-happy local utility organization writes its own better public relations ticket.

The Experience of Others

There are some things that are better left unsaid, but this is not one of them. It is a criticism that can be truly made of most of the gas industry. You have heard it, maybe you have said it. It generally starts, "But our territory is different, etc., etc. . . . " Appliance and equipment manufacturers, at their wit's end to serve the gas industry adequately, are confronted daily with special requests, demands and designs to meet—"because our territory is different." Honestly, it isn't all that different in most instances, and where it is, it must be recognized as a sad reflection on an industry that has been serving the American public for over one hundred years. We feel the real answer is an inlaid "rugged individualism" far too prevalent in the industry, and which makes so many gas men reluctant to accept the experience of others.

Too many of us feel we have to start from a scratch defined by the horizons of our own operations. How else can you explain the lack of uniformity throughout the industry?

For example, there are literally almost as many so-called "Dealer Co-operation" plans in the gas industry as there are gas companies. Every manufacturer is practically forced to set up a card index system on his product, no matter how simple it may be, to meet the whims and fancies of his gas company customers. Besides being foolishly unnecessary, it is needlessly expensive. Apparently the experiences of others count for naught.

The Apmann-Little article on space heating is a case in point. Despite the experience and known ability of the authors, it is an odds-on bet that though many may read it, few will grab on to that Derby experience as something that has money making potentialities for their own companies. No sir! Our territory is different—people won't be interested—it would be too much trouble to train our salesmen, who have more than they can handle now—those dumb klucks at the shop would be sure to ball it up. And so on, *ad nauseam*.

And the world goes rolling by.

The Mass Market ... No. 6

The Salesman's Compensation and Its Relation To Mass Marketing in the Manufactured Gas Utility Territories

By STANLEY JENKS

FOLLOWERS of this series of articles must have realized from the first that the writer was being deliberately provocative. Facing the fact that the manufactured gas industry's old man of the sea is a burden of too many unprofitable customers, I have been attempting to argue the problem from this or that angle in the hopes that a constructive solution might be developed. The series so far has dealt with such basic points as the capacity of these people to use more gas, and some uses that might tempt them to do so, analyzed solely from a practicability angle. In other words, these 90 per cent of our domestic customers using less than 20 therms a month are using other fuels in their homes. The evidence has been presented conclusively, I think, that gas could be substituted for these fuels if we would bend over backwards ourselves, rather than insist that the poorer class of customer bend over backwards to meet our *too* high standards so far as they are concerned.

Back To Fundamentals

Intimately tied in with load-building in the lower income group field is the question of salesman's compensation, and to study it adequately for our present purpose, it is necessary to go back to fundamentals.

We sell or stimulate the sale of gas appliances to build new load primarily. A secondary reason is to establish a quality appliance standard in order that the merits of gas service will not be jeopardized by inferior appliances connected to our system. No one can quarrel with such a policy because it involves our very existence—this right to retain control over our own development—it is a practice that should be zealously maintained. And yet, merchandising is still one of the most controversial topics in the gas industry. Why?

It seems to me that the real rub is the fact that every time a "prospect" steps up to the plate, we are trying to pull off a double play. A twin killing—the load from the appliance and the merchandise profit. And those familiar with the real economics of the attempted play, know how rarely the double play is really made, and how often in attempting to get both runners, we fail to get either. Even the champion Yankees make sure of one runner, and if they can get the other afterwards, so much the better.

Now, as a gas company, whose paydirt is load, it is elementarily obvious that load is the primary objective from the sale of gas appliances. But, bless your soul, how many salesman's compensation plans in practice recognize that all-important fact? Very, very few, it must be confessed. The answer is fallacious thinking at the outset. The theory is that the greater the *volume* of gas appliances sold, the greater the resultant load. And this is not necessarily so. In fact, in a replacement market, with the greater over-all efficiencies of modern appliances, the very reverse is true. Please don't feel that I am arguing against the sale of modern appliances, for I am not. Their load insurance value and their asset as indirect load-builders are factors of the utmost importance. My point is that volume of sales is no real index with which to measure the load-building results of an appliance sales program. What is then?

Our Domestic Load

First, let us examine the characteristics of our domestic load. Roughly we can divide it into two parts (1) basic and (2) incremental. Basic load is that consumption which is so accepted by the customer that our ratemakers can establish a charge for the service in which are incorporated most of the fixed charges for service. In the main, it is normally non-competitive business. In the electric utility business it is lighting. With us, it has been and always will be cooking.

Incremental load is that business for which we have to compete actively with other fuels, and because of the competitive situation and due to our basic load charges, having absorbed much of our fixed charges, we are able to secure profitably on lower margins. In the electric business, the incremental loads of particular interest to us are cooking (our basic load), refrigeration and water-heating. Our major incremental loads are water-heating, refrigeration and space-heating. So far, so good. The significant point is that the incremental loads are profitably impossible, unless the customer is a basic load customer. Therefore, a salesman's compensation plan should be aimed primarily at the basic load, and not at the total *volume* of sales. To put it another way, gas company salesmen should be paid to build profits from the sale of gas, rather than to sell appliance volume.

A Problem To Solve

The lower income group customers—90 per cent of our total customers—are either unprofitable or bordering on it, a fact we must never forget, and any discussion of salesman's compensation promising a help in solving this problem is most pertinent at this time.

At the risk of being repetitiously boring, let me again quote the A.G.A. Rate Committee 1938 Report (Table No. 1). The average yearly revenues in manufactured or mixed gas territories are also listed in Table No. 1.

The conditions under which an appliance is sold, as can be readily seen, determine its revenue producing value to the company. For example, a gas range sold to a previously non-gas user produces $25.31 additional annual revenue. What is its value when replacing another gas range? In the Northern Indiana Public Service Co. a few years ago, when devising a load-building salesman's compensation plan, after exhaustive studies of customers' bills before and after buying

TABLE NO. 1
(Report of A. G. A. Rate Committee, 1938.)

Service	Average Cost Per Therm: *Manufactured or Mixed Gas Cities (5,381,000 Customers)*	*Natural Gas Cities (2,270,000 Customers)*
Cooking (10.6 therms)	19.9c	11.5c
Manual water-heating (9.0 therms)	17.4c	6.6c
Automatic water-heating (20.0 therms)	16.3c	6.9c
Refrigeration (10.0 therms)	14.4c	6.8c

(Average Yearly Revenue)

Cooking	$10.6 \times 0.199 \times 12 = \$25.31$
Manual water-heating	$9.0 \times 0.174 \times 12 = 18.79$
Automatic water-heating	$20.0 \times 0.163 \times 12 = 39.12$
Refrigeration	$10.0 \times 0.143 \times 12 = 17.16$

a new gas range, we found an additional use of 38 therms annually. Using the A.G.A.'s $0.199 per cooking therm, it can be assumed, therefore, that a replacement gas range sale adds $38 \times 0.199 = \$7.66$ annual revenue. (It's new and they use it more.)

An automatic storage water heater replacing a manual gas heater adds $39.12 — $18.79 = $20.33 annual revenue. Replacing a "bucket-a-day" coal heater it adds $39.12.

The next step is relatively simple. A leading electric utility sales executive once told me that it was perfectly sound to charge 50 per cent of the first year's added revenue from the sale of an appliance to the new business expense of selling that appliance. Space does not permit me to elaborate that statement, but I know from personal experience that it is true, and what is more logical to incorporate an attractive part, if not all, of that 50 per cent in a salesman's compensation plan.

In fact, let's get down to cases. Quotas, based on local experiences and surveys, should be assigned to closed territories based on added revenue expectancies. A salesman should be told, "This year your quota is $..... added revenue based on the appliance revenue credits shown on this list." The list, of course, will be compiled to fit local rates. All expenses of the merchandise sales department should be charged to new business, merchandise profits deducted from the total and losses added. Appliance sales should be computed in added revenue values and the ratio between total added revenue and total new business expense (charged to merchandise) gives the management an immediate picture of (1) the real cost of getting the business; and (2) the effectiveness of the merchandise sales department.

How does this affect the low income bracket customer, you may well ask. In practice very decidedly, because now that the salesman is directly interested in adding load rather than commissions for volume appliance sales, he has every inducement to work the hardest, where most load is available. Under a plan like this, it would be far more profitable for him to sell a modest gas range to a non-user of gas than to spend his time looking for replacements in an already load-producing field. A variation of this general principle of compensation in the Northern Indiana Public Service Co. extended to an employe campaign for the re-connection of "dead" services produced in two months' estimated added annual revenues of $97,637 at a new business cost of $10,531 and without any extra investment cost.

Space has limited me to generalities, but in practice I know from practical experience a load-building salesman's compensation plan will work, if properly studied out and administered.

Its great merit is it makes the gas utility salesman fundamentally load-minded. Today, he is commission-minded, and accordingly stays away from the lower-income group customers, whose potentialities in his mind are nil, but who nevertheless represent a vast untouched source of gas company revenue if developed.

A. E. Holloway Is Nominated For P. C. G. A. Presidency

GAS will be "on parade" when President H. L. Farrar calls to order the 46th annual meeting of the Pacific Coast Gas Association at the Fairmont Hotel in San Francisco on September 6. Every evening of the three-day meeting is to be free from convention functions to allow delegates to attend the Fair and to see San Francisco, with the exception of Friday evening, September 8, when the banquet and ball will be held.

Because of the popularity of P.C.G. A. conventions with delegates' wives, special social functions are being arranged for them by Mrs. H. L. Farrar. Luncheons will be given at the Yerba Buena Club in the Fair Grounds and at the California Golf Club, and a reception and tea at the Mark Hopkins Hotel the first afternoon.

Details of the program have not been announced because of its many unusual and colorful features. However, the general plan of the program is for the general sessions to be held in the mornings and parallel meetings of the various sections in the afternoons. Thursday afternoon, September 7, has been reserved for the annual golf tournament and the skeet shoot. A new golf trophy has been provided by Messrs. Basford, Babcock and Pederson.

At the first general business session, September 6, the nominating committee, J. F. Pollard, Seattle Gas Co., chairman, will submit its report:

For president: A. E. Holloway, vice president of San Diego Consolidated Gas & Electric Co., San Diego, Calif.; *for vice president:* Robert A. Hornby, vice president of Pacific Lighting Corp., San Francisco, Calif.; *for treasurer:* D. G. Martin, general auditor of Pacific Gas and Electric Co., San Francisco, Calif.; *for directors:* E. M. Banks, vice president Southern California Gas Co., Los Angeles, Calif., R. S. Fuller, engineer gas construction and operation, Pacific Gas and Electric Co., San Francisco, M. A. Pooler, vice president and general manager, Tucson Gas, Electric Light & Power Co., Tucson, Ariz., C. H. Potter, commercial manager, Southern Counties Gas Co., Los Angeles, Calif.

Present directors who will continue in office for another year are: R. E. Easton, president, Santa Maria Gas Co., Santa Maria; R. G. Logue, vice president, Ward Heater Co., Los Angeles; W. R. Smith, secretary, Continental Water Heater Co., Los Angeles; John J. Winn, Jr., commercial manager, Portland Gas & Coke Co., Portland; H. L. Farrar, as outgoing president, will also be a member of the Board.

For those coming to San Francisco from California points reductions in railway fares are available on the certificate plan. These tickets will be on sale from September 2 to 9, inclusive, and return limit will be September 19.

F. F. Doyle, Pacific Gas and Electric Co., is general convention chairman.

By W. R. SCHNEIDER
Pacific Gas and Electric Company*

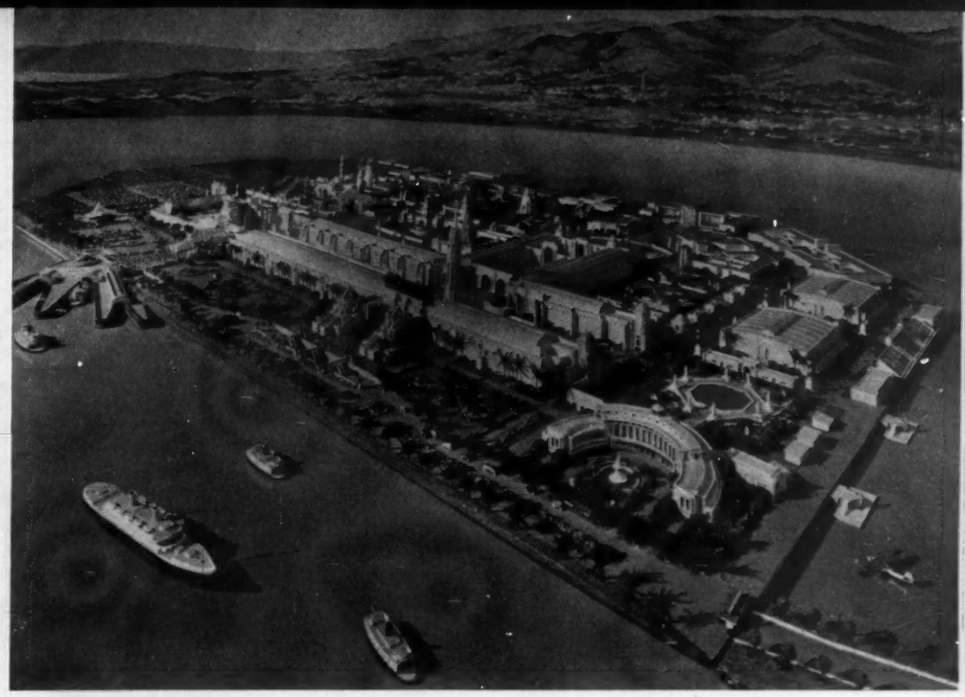


FIG. 1. Treasure Island, scene of the 1939 Golden Gate International Exposition. The fill is adjacent to Yerba Buena Island in San Francisco Bay. The model is 16 ft. long, weighs a ton.

Cathodic Protection ON TREASURE ISLAND

THE application of electrical protection to the Golden Gate International Exposition network is of particular interest, as it shows what can be done in this way on a city network having five utility systems made of the following: (1) bare pipe, (2) wrapped pipe, (3) thin wall pipe, (4) standard weight screw-connected pipe, and (5) lead covered telephone cable.

All of these were installed in a non-homogeneous highly corrosive fill, taken from the bottom of San Francisco Bay (Fig. 1). Typical soils encountered in this area are as follows:

Formation	*Corfield Corrosivity Factor*	*Equivalent Sheperd Rod Ohms/cm²*
Blue Marine Clay.....	17.2	114
Sand	2.1	1840
Yellow Clay	3.1	1115
Blue Marine Clay.....	9.1	267
Coarse Sand	.9	6050
Clay and Sand.....	9.5	255
Sand and Salt Water*	10.1	242

*From bottom of 20 ft. vertical ground electrode.

The pipes, laid in trenches cut through numerous ridges and strata of dense, impervious, unleached clay, and layers of moist, partially leached sand, were subjected to the severe corrosive action of innumerable galvanic couples in addition to the usual action of the very corrosive material in the fill.

In Table No. 1 are summarized the sizes, wall thickness, and type of protection used on the different pipe systems.

The thin walled No. 16 gage pipes, which were later calculated as having a possible life of 10 months, failed in 90 days. The domestic water system was the last network to be installed and was completed April 10, 1938, and the first failure occurred on July 22, 1938.

Electric protection was then called upon to protect the dipped and bare pipes and supplement the protection given by the wrapping on the high pressure system. The first electric protection units were placed in operation at Station No. 1, on Clipper Way near California Avenue, on September 12, 1938, at which time leaks had already begun to develop at an alarming rate on the domestic system.

Following a conference with the Engineering Department of the East Bay Municipal Utility District, the following plan, suggested by H. A. Knudson, electrical engineer of the Utility District, was used by the Department of Water Supply and Sanitation to determine the approximate amount of current required for electric protection of the network.

The total surface area of the five pipe networks was calculated, and arbitrarily chosen constants applied to the protected pipes. By assuming certain efficiencies for each of the coatings used, the constant or "bareness factor" reduced all protected pipe areas to equivalent bare pipe.

The minimum current required for the combined networks was then found by multiplying this "equivalent bare pipe" area by 15 milliamperes per square foot. The total current thus found was 427 amperes.

This method of estimating the amount of current required for a network is rather arbitrary and its success depends largely on the experience and good judgment of the corrosion engineer recommending it. It requires uniform corrosion conditions over the network to be protected, but was probably the best that could be done under the conditions existing on the Island, as was later found to be the case.

On account of the intense construction activity on the Island during the last six months before the opening of the Exposition on February 18, it was not possible to make the necessary preliminary tests before applying electric protection.

The bonding of high resistance joints, removing of accidental contacts, installation of insulating couplings, etc., were carried on while the cathodic corrosion eliminators were being installed. The various factors used are given in Table No. 2.

In order to assure more uniform distribution of current over the Island, the area was divided into four parts hav-

*Excerpts from a paper, "Cathodic Protection on Treasure Island Golden Gate International Exposition," to be presented before the 46th Annual Convention of the Pacific Coast Gas Association, Fairmont Hotel, San Francisco, Calif., Sept. 6-9, 1939.

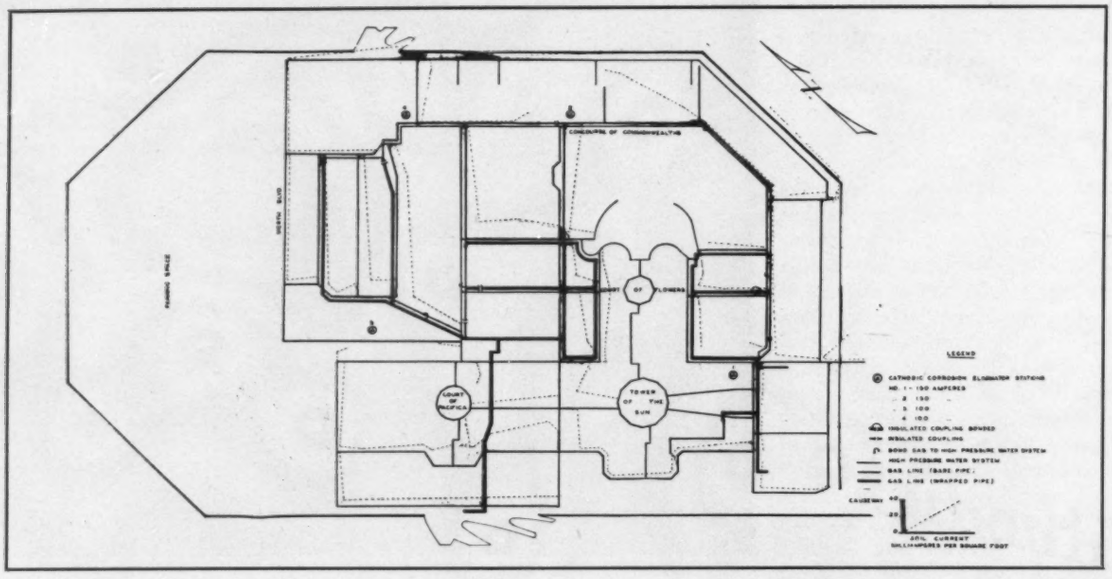


FIG. 2. Gas system with bonds to high pressure water system.

ing equivalent bare pipe areas. The center of gravity of the combined networks in each quarter was then determined and a 100 ampere cathodic protection station planned for this point.

Since the center of gravity of a network and the center of corrosion activity are not necessarily at the same point, this is seldom the most effective location.

Most Effective Location

As a rule the most effective location of a cathodic protection installation on a pipe system is at the point of highest soil corrosivity, the point of greatest current discharge, or at the point of maximum number of failures. Since the maximum corrosivity is not necessarily at the center of gravity of a pipe or network, there is no particular advantage in determining this point if preliminary tests can be made. When several locations must be protected from one station, the minimum power loss can be obtained by determining the center of the moment of inertia of the system. This may be modified, depending, however, on the available location for the ground electrode, size of mains, location of power supply, etc. The loads used by cathodic protection up to the present time have been very small. Such detailed calculations are, therefore, not warranted as yet.

Based on the estimate of 427 amperes being required to protect all of the pipes on the Island, ten 8-volt, 50-ampere, type "C," Rexselen, cathodic corrosion eliminators were purchased by the Exposition company.

On September 13, 1938, the Pacific Gas and Electric Co. received a request to lend their electrolysis engineers and test equipment to the Golden Gate International Exposition to make a survey and recommendation for the elimination of corrosion on Treasure Island. This request was transmitted to the Bureau of Tests and Inspection and the work started.

Several plans of attacking this problem were considered. The mains having been already installed by the Exposition company, there was no opportunity to inspect the placing of the pipe in order to make the system suitable for cathodic protection and reduce the amount of current required to a minimum.

The two most promising methods considered were:

1. Isolate the four portions of the Island's networks with insulating couplings and protect each quarter with a cathodic protection unit placed approximately at its center. This would give four smaller networks of approximately one-eighth square mile area each with a large number of insulating couplings between, all which would have required tests and resistance shunts to avoid corrosion on the positive side of the coupling. This latter item requires careful consideration when thin walled pipe is involved.

2. Use the high pressure water system which had the best insulation and the greatest conductivity, as a negative bus, or negative grid, over the entire Island. Isolate all other pipe networks from the high pressure system and connect them to it by means of bonds, either solidly or through resistances, and thus control the pickup on the different systems. By this method the cathodic protection stations could still be installed at the four locations previously selected, and the use of the bus system has the advantage of requiring a minimum number of insulating couplings to be adjusted, and maintained in adjustment, throughout the year. It also has the advantage of using adjoining units to pick up a portion of the excess load if the weather conditions, gardening activities, or new pipe installations increase the load in one section.

The second method was used as it promised greater flexibility and permitted the entire installation to be completed in the minimum of time.

Eliminators Installed

The cathodic corrosion eliminators were then installed in the four locations previously selected near the approximate center of gravity of each quarter, in accordance with the plan previously outlined. See Fig. 2 for locations of these eliminators.

The ground electrodes are of two types: vertical steel pipes, and the horizontal steel pipes placed in the trenches.

The ground bed at Station No. 1 consists of 21 vertical 5-in. pipes, 20 ft. in length and spaced 10 ft. apart. The lower portions of these pipes are in salt water.

In this case the lower ends of the ground rods or pipes discharge practically all of the current, but the maximum corrosion on a vertical steel electrode generally takes place in the capillary fringe a few feet above the water table. The rapidity of the corrosion at this point usually cuts off the most active portion of the electrode within a year or two, although there may still

be sufficient metal below the capillary fringe for many years of service.

In order to avoid the possibility of this loss of active electrode surface, a rubber covered cable from the cathodic corrosion eliminator was placed inside of each pipe and welded to the internal surface at several points along its length, as shown in "a" of Fig. 3.

These internal welds are made through openings or "windows" cut into the side of the pipe with a torch. The piece thus removed is usually eight or 10 in. in length and half the circumference of the pipe in width. The rubber covered cable is stripped for a few inches, brazed to the inner side of the pipe, and then bent up as shown in the figure before being continued down through the pipe to the next contact. The exposed copper at the brazed connection is carefully primed and a cup, made of one-half of a 3-in. pipe, closed at one end, is welded over it. This cup is then filled with asphalt so as to completely seal the exposed copper. The pocket should be deep enough to permit the asphalt to cover at least one inch of the rubber insulation. It is necessary to use some sort of a retainer of this kind in order to prevent the plastic flow of the asphalt eventually exposing the copper to water, soil, or moisture that may find its way into the pipe.

The resistance to remote ground of electrode No. 1, consisting of 21 5-in. by 20-ft. pipes, whose lower ends are in salt water, spaced 10 ft. apart in a straight line, is .030 ohm and the resistance between the ground bed and the pipe network, measured at the corrosion eliminator terminals, is .054 ohm.

Cathodic Protection Station Nos. 2, 3, and 4 have 21 10-in. by 12-ft. horizontal pipes laid at the moisture level in trenches. These trenches vary from 6 to 14 ft. in depth.

Drag Line Excavation

The deeper trenches were excavated with a drag line. Station No. 4 ground electrode excavation was dug to a depth of 14 feet to the blue clay shoal on which the Island was built.

The horizontal pipes were connected with a rubber covered cable brazed in place. The brazed connections were primed and enclosed in a rectangular wooden box which was filled with asphalt. (See "b", Fig. 3.) These cables are connected to each length of pipe at two places; that is, at the first and third quarters of each pipe length.

The resistances of the horizontal electrodes are as follows:

Cathodic Corrosion Eliminator Sta. No.	*Depth (in Feet)*	*Resistance to Remote Soil (Ohms)*
2	14	.062
3	6	.081
4	12	.029

While the work of installing the corrosion eliminators and the ground electrodes was being carried on, a crew of men loaned by the Construction Division of the Exposition were clearing accidental contacts between various pipe systems and between pipes and lead covered telephone cables. In most cases it was possible to effect the desired separation by driving a 2-in. wooden wedge between the conductors.

A radio frequency pipe locator was used in locating pipes and intersections, and proved to be a very valuable instrument for this purpose.

Eleven flexible couplings which, on excavating, were found to be Dresser connections, were bonded with the result that it was possible to carry the protection from the No. 1 Station over toward the Causeway, 1000 ft. away.

The gas system consisting of bare 2½, 3, and 4-in. screw connected mains, and smaller sizes of wrapped and welded lines, was subdivided in order to insulate the wrapped from the bare portions of the main.

The fact that in the short time available to complete the work, all of the accidental contacts, high resistance couplings, etc., were not corrected, was evident later when it was found that the four stations were not dividing the network evenly. The leak curve having flattened out, no attempt was made to rectify this condition.

Insulating Couplings

The gas system as previously mentioned consists of both wrapped and bare pipe. In order to obtain a proper distribution of the protective current in this system, the pipe system was subdivided by 12 insulating couplings which separated the insulated portions from the bare portions.

The individual sections were then protected by connecting them to the

TABLE NO. 1. STEEL PIPE LENGTHS FOR UTILITY SYSTEMS ON TREASURE ISLAND

(Length in feet)

Size Inches O.D.	*Wall Thickness Gage No.*	*Inches*	*High Pressure*	*Domestic Water*	*Sprinkler Systems*	*Sanitary Force Main*	*Gas System*
16	10	.1406	12639	.....	.....	2051	.....
14	14	.0766	.....	.....	.....	734	.....
12	12	.1093	13639	.....	.....	.....	.....
10	12	.1093	14300	.....	.....	2692	.....
8	14	.0781	7618	15721	.....	4522	.....
6	14	.0781	.....	15223	.....	1440	.....
4	16	.0625	.....	755	.....	.....	.....
4	Standard	.237	.....	4945	557	.....	* 4908
3	Standard	.216	.....	1392	.....	.....	* 2121
2½	Standard	.203	.....	1886	1721	.....	* 1073
2	Standard	.154	.....	.....	3462	.....	12963
1½	Standard	.145	.....	.....	5887	.....	4460
1¼	Standard	.140	.....	.....	1164	.....	1357
1	Standard	.133	.....	.....	17093	.....	300
	TOTALS:	Feet	47980	38530	31276	11439	27182
		Miles	9.1	7.3	5.9	2.2	5.17

1. All sanitary force main pipe is No. 14 gage.
2. No service connections (gas, water) or hydrant leads included: **High Pressure:** Welded steel asphalt dipped and wrapped pipe. **Domestic Water:** Welded steel asphalt dipped. **Sanitary Sewer:** Welded steel asphalt dipped. **Gas and Sprinkler System:** Standard black steel, screw connected, laid bare.

*Bare pipe but includes 953 feet of 3-in. wrapped pipe. All others wrapped and includes 720 ft. of 2-in. bare pipe; 4460 ft. of 1½-in. bare pipe; 450 ft. of 1¼-in. bare pipe; and 300 ft. of 1-in. bare pipe.

TABLE NO. 2. EQUIVALENT BARE PIPE AND ESTIMATED CATHODIC PROTECTION CURRENT REQUIRED

Pipe System	*Bareness Factor*	*Equivalent Bare Area in Sq. Ft.*	*Cathodic Protection Current Amperes at 15 MA per Sq. Ft.*
High Pressure (Single Wrapped)	.02	3,240	48
Domestic Water (Dipped)	.10	6,468	97
Gas (Bare)	1.00	16,140	242
Sanitary Force Sewer (Dipped)	.08	2,420	36
Sprinkler System (Bare)	1.00	280	4
TOTAL		28,548	427

negative bus of the Cathodic Protection Station, or to the nearest high pressure main.

The bonds were either solid low resistance connections, or resistance couplings, which limited the flow of current, as shown by the earth current meter, to the amount considered necessary.

In each station the negative terminal of the corrosion eliminators was connected to a common negative terminal or bus. Separate cables from each of the individual pipe systems to be protected were brought in to this bus and either connected to it directly or through a resistance.

With the preliminary work completed on the different networks, cathodic protection was applied, and the output of the stations adjusted to reduce the potential of the high pressure system over the entire Island to as uniform a potential level as possible. Earth current tests showed that all high pressure lines received current from the surrounding soil in proportion to the soil conductivity at the particular location.

The soil current distribution of the current flowing to the high pressure system is shown in Fig. 2.

In order to locate high resistance couplings on the high pressure main without opening the pavement, potential tests were made between the fire hydrants. In this way a number of flexible couplings (Dresser type of coupling) were located.

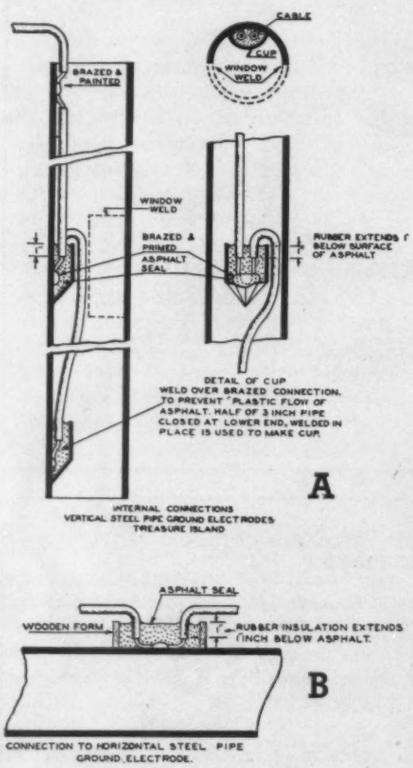

CABLE
CUP
WINDOW WELD
BRAZED & PAINTED
WINDOW WELD
BRAZED & PRIMED ASPHALT SEAL
RUBBER EXTENDS ½" BELOW SURFACE OF ASPHALT
DETAIL OF CUP
WELD OVER BRAZED CONNECTION. TO PREVENT PLASTIC FLOW OF ASPHALT. HALF OF 3 INCH PIPE CLOSED AT LOWER END, WELDED IN PLACE IS USED TO MAKE CUP.
A
INTERNAL CONNECTIONS VERTICAL STEEL PIPE GROUND ELECTRODES TREASURE ISLAND
ASPHALT SEAL
WOODEN FORM
RUBBER INSULATION EXTENDS ½INCH BELOW ASPHALT.
B
CONNECTION TO HORIZONTAL STEEL PIPE GROUND ELECTRODE.

FIG. 3. Details of the ground electrode connection on Treasure Island.

The domestic water system was then adjusted. This network was already connected to the high pressure system through three regulators.

Additional bonds were installed between the domestic and high pressure systems when domestic lines of small diameter were long and their resistance prevented a protective current of sufficient magnitude to enter near the end of the line. The fresh water supply line to the Sunken Gardens, east of the Administration Building, was a case of this kind. This line was approximately 1000 ft. long and being only a 2-in. pipe, was unable to return the current picked up, back to the low pressure main to which it was connected, without an excessive drop of potential at the fountain. This resulted in under protection at the Sunken Garden end and consequent failures. This difficulty was remedied by connecting the far end of the 2-in. line to the nearest high pressure main, 100 ft. away.

Pipes Separated

Ten insulating couplings were installed on the gas mains, in order to separate the larger bare pipes from the smaller wrapped mains. Previous experience has shown that a bare portion of the pipe line, if laid in low resistance soil, will reduce, if not practically prevent, the application of electrical protection to the insulated portion. The current from the ground electrode will enter the bare pipe and return to the corrosion eliminator without setting up a sufficient potential through the wrapping. In electrical phraseology the insulated pipe has been "short circuited."

Each section was connected, either directly or through a resistance, to the negative bus at the cathodic protection station or to the nearest high pressure water main, if the Station were too remote.

Each section was tested with the earth current meter during the adjustment of the bond so that no portion picked up an excessive current. The six miles of sprinkler system, consisting of standard weight, 1- to 4-in. bare, screw-connected pipe, laid in the planted area, was not connected directly to the corrosion eliminator's bus, but received its protection from the connection with the domestic system.

In a few locations where the lines were inadequately protected due to the long run of pipe, the sprinkler pipes were bonded to the low pressure domestic or the high pressure lines at one or more of these locations.

Due to the urgency of work on other pipes, few tests were made on the sprinkler lines.

The sanitary force system lines which were connected to the protection system were connected directly to the negative bus at the cathodic protection station.

The sanitary force main is a welded pipe line, 8, 12 and 16 in. in diameter, and .0766 in. in thickness. The pressure is only sufficient to carry the sewage to the bay.

Tests on the lead sheath of the telephone cables were made by the Pacific Telephone & Telegraph Co.

Three bonds were installed between the lead sheath and the water main at three locations at which it was found that the cables were positive to other structures. The power cables are rubber-covered and buried directly in the soil so that no electrolysis protection was required.

No survey was made before electric protection was applied to the network, so that it is not possible to indicate definitely the changes that have taken place in the soil and pipe currents.

The effectiveness of the protection is shown by the cumulative leak record shown in Fig. 4 which gives the total of known failures on the Island.

As previously mentioned, the first failure occurred in the domestic system on July 22, 1938, 90 days after the installation of the domestic water system had been completed. After this the number of failures per week were as shown on the cumulative curve.

The irregularity of this curve is partly due to the fact that the leaks recorded are those observed on the surface of the ground and those found when excavations were made for cable lines, pipe lines, and for tree planting. The grounds were not patrolled at regular intervals for the purpose of discovering pipe failures, hence many leaks were not reported as soon as they occurred.

During the seven-week period preceding September 7, 1938, when cathodic protection was first applied, corrosion progressed at a natural rate. From the data obtained during this short interval, the approximate empirical equation showing the relationship between the number of low pressure leaks and time, was found to be:

$F = 1.82T^{1.66}$ in which,
F = total number of failures
T = time in weeks, beginning July 25.

From the time the first protective current was applied on September 7, the recorded failures deviated from the parabolic curve to a greater degree as time progressed.

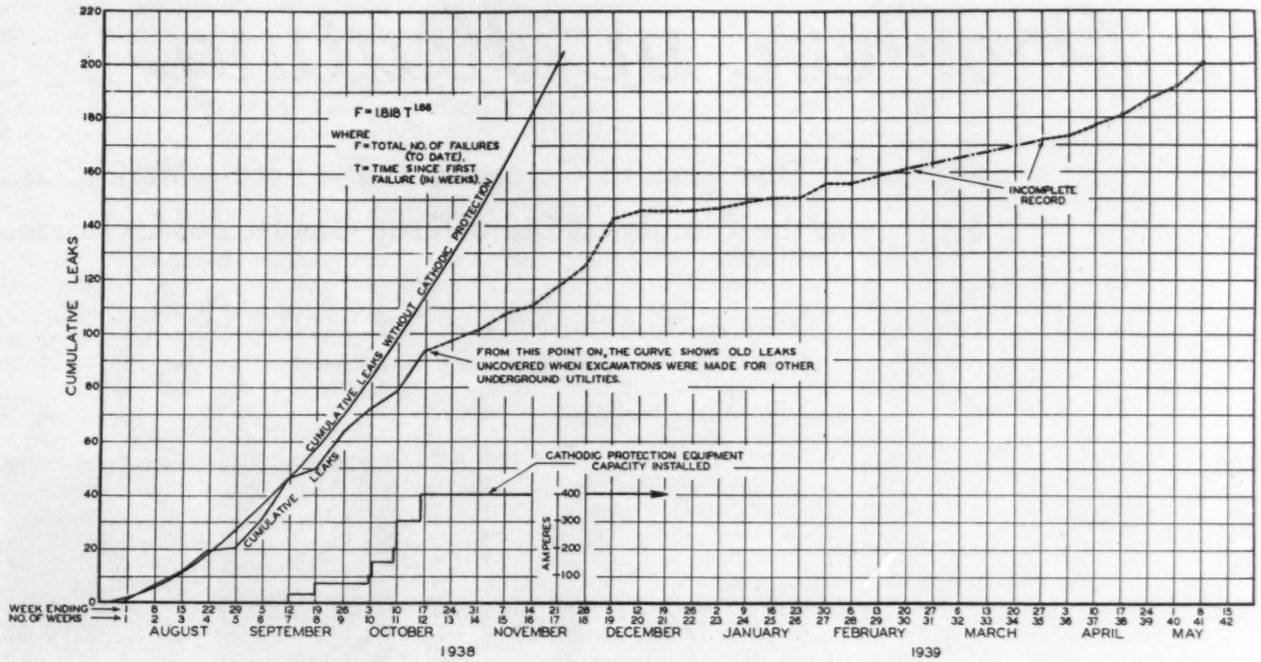


FIG. 4. Cumulative leak curve.

The curve showed a tendency to flatten out on October 10 when 300 amperes were applied. The sudden rise of leaks shown during the week of October 10 to 17 was due to the large number found during ditching operations along the main thoroughfares. From this point on until the end of February, 1939, it is assumed that the rise of the curve was due to old leaks previously undiscovered, and by water hammer which was known to exist.

The Exposition opened on February 18, and it is estimated, at that time, there would have been about 518 leaks, made evident by water on the surface of the ground, if electric protection had not been applied, instead of the total of 146 actually reported.

Failures Estimated

The number of undiscovered leaks that are draining away into the sand and do not show on the surface of the ground probably reach a very large figure, and if their increase had not been checked, would have caused a serious loss of water. It is estimated that the undiscovered sub-surface failures would have been approximately 1510 and those evident on the surface of the ground 518, making a grand total of 2028, on the opening date of the Exposition on February 18.

The empirical equation given above implies that at the end of the Exposition period (71 weeks after the first pipe failure) there would have been a total of 2180 leaks discovered on the surface of the ground and 6370 sub-surface leaks not made evident by water on the surface.

After the completion of the major construction operations, such as the installation of underground power cables, tree planting, and service connections for gas and water, the curve became horizontal, indicating that no new failures were developing.

The number of new leaks reported per week dropped until finally only one was reported in five weeks.

About April 1, 1939, the failures again showed increase. The cause of the water hammer that had previously opened the deeper pits that had almost perforated the pipe walls was corrected. The new troubles were again due to corrosion.

The electrical pipe protection installations and adjustments on the pipe network, as it then existed, were completed in November, 1938. Several months later the various concessions installed additional pipes which were connected to the main network. Twelve hundred feet of 10- to 16-in. asphalt-dipped circulating main was also connected to the network.

The gas services were connected through insulating couplings at the meter, but the water services were not isolated from the rest of the water system. This resulted in an extension of the network area by an amount variously estimated at 10 to 30 per cent.

Since the output of the four stations was not increased, the original network was to some extent underprotected. A survey of the situation showed the new corrosion difficulties appearing to cluster in four locations.

The necessary tests were made and two new installations were recommended. These will be installed. It is expected that, if no further changes are made on the underground system, there will be very few failures during the balance of the Exposition period.

The development of new failures, by the installation of additional pipes, indicates forcibly the necessity of proper supervision and occasional tests on a cathodically-protected system as a network expands or changes.

Future Value

The success with which electric protection on Treasure Island was attended is gratifying because of the usual combination of difficulties encountered. The information and experience gained will be valuable for future use when applying protection of this type to city networks.

The area now under control covers approximately one-half of a square mile of pipe network. The fact that this area requires the unusually large amount of current of 500 amperes (1000 amp. per sq. mile) should not deter any corrosion engineer from applying cathodic protection in, or to, a city network. When applying electric protection to a city network, there is usually sufficient time available to make all the necessary changes and adjustments required so that but a fraction of the above current will be required.

A Problem in Heating

Discloses To One Eastern Company That a Fertile Market Lies In Promoting the Circulated Direct-Fired Gas Heater for Homes

By A. M. APMANN and C. E. LITTLE

The Derby Gas and Electric Company, Derby, Connecticut*

SALES managers of every industry think their headaches are the worst and that their problems are more difficult to solve than those of any other individual. However, it can be definitely stated that there is no industrial group that has quite the same type of competition as is faced by the sales departments of manufactured gas utilities. Not only do the sales managers of these companies face the inevitable competition with every piece of equipment which is striving for a share of the customer's dollar; not only do they compete with specialty sales organizations selling appliances for competitive fuels, but they are faced with internal problems of how best to supply the customer's needs with the amazing array of appliances which they have available.

The four major jobs of household gas operation give the customer properly prepared food; preservation of food before and after preparation; an abundant supply of hot water for regular and emergency needs and carefree and economical comfortable warmth. From the standpoint of the customer it is simple. From the standpoint of the sales executive of a manufactured gas utility the problem is tremendous. In this discussion three of the four important jobs will be eliminated because of the general acceptance which is given to them. The use of gas for cooking has complete customer acceptance for the obvious reasons of speed, flexibility, accurate control and the utmost in economy. The supply of hot water by gas is accepted for the same reasons although automatic water heating acceptance has not been reached at present because of many reasons which require more analysis than this discussion will allow.

*AUTHORS' NOTE: Since the article herewith published was prepared, results of similar installations made at New Bedford have been made available. These have been computed along somewhat different lines but show a factor only slightly higher. Before definite operating factors can be released, it is hoped that all companies will analyze their results and submit them to A. G. A. headquarters for tabulation.

Automatic refrigeration by gas has popular acceptance in large industrial cities, in small residential towns and rural areas where various types of gaseous fuels are available. But the widespread economical heating of homes has not as yet made any great impression in the manufactured gas territories, at least on the available "mass" market. The reasons for this lack of acceptance are many but foremost can be mentioned investment, lack of mobility and fear of operating costs.

In the past two years some few companies in the manufactured gas areas have taken steps which in the minds of many in the industry may seem to be backward. In the years prior to the World War direct gas fired heaters were sold in great profusion. They were merchandised very much like toasters. Campaigns consisting of fitters on trucks went through the most congested areas of the city and sold thousands upon thousands of radiant gas heaters and pressed steel radiators. The terms were within the pocketbook of even the poorer customer and the operation gave the type of heating that the customer desired.

It is essential when a change is made from a parlor stove to a direct-fired heater that the living habits of the customer continue as before. Many of us thought little of these customers after the installation was made and few stopped to analyze the resulting consumptions and revenues. The entire endeavor was dismissed with the thought that the customers were not using the heater and consequently no more could be expected from the sale of such equipment.

Soon after these great campaigns were launched for central heating of residences, the great benefits of eliminating coal, ashes, and smoke from living rooms heated by parlor stoves were stressed. The simplicity of firing a simple piece of equipment located in the cellar was emphasized

A. M. APMANN

C. E. LITTLE

again and again. The gas industry became responsive to this clamor and central-fired gas heating appliances were produced well over 30 years ago. After laboratory developing and testing, field testing followed and installations were made.

No great "mass" market has ever been developed for this type of gas heating except in those few instances where intensive sales efforts and cleanliness movements pointed the way out. Stepping up a customer from the economies of direct heat to the higher costs of a central-fired plant even with all the advantages worked against the very wonderful results which automatic central-fired gas heating equipment could perform. Added to this is the fact that in the congested cities of the Northeast more than 60 per cent of the families are renters and move frequently. Obviously, a permanent piece of equipment does not meet with the needs of this "mass" market.

In the Fall of 1937 after some very successful results the sale of automatic fired equipment, chiefly unit heaters for commercial establishments, was beginning to slow up, a fortunate circumstance brought to our notice an appliance in every way similar to the unit heater which could be satisfactorily used in small homes, particularly those on one floor. The sales story was well known to us so that a few typical installations could be made. Estimates

were made on the basis of the usual data, but very little of real definite information was available for the use of such forced circulation direct-fired heaters. In the course of the first few months, we were much astonished by the results. Operating costs which were in no way comparable to existing information resulted in practically every case. Estimates were recalculated to determine what if anything was wrong, but in each case the recalculated estimate varied in no way from the original, and the conclusion was obvious that there were some new economies available with this type of heating equipment.

Briefly, this type of equipment consists of the following important component parts. A thermostatically controlled Bunsen type burner firing into a well designed heating section; a circulating fan controlled by a fanstat to draw the air from the floor and after passing over the heating sections to deliver it in a horizontal plane from a point near the top of the heater. Room thermostats control the desired temperature in the rooms.

Heaters of this kind are built by various manufacturers in different ways, but the more practical and the ones which have given the best results are those which deliver the air horizontally so that this air will have sufficient velocity to carry through the doors from one room to another. Heaters which discharge heat vertically or too greatly deflect the air downward or to one side are handicapped by the lack of suitable velocity to circulate satisfactorily throughout the various rooms of a so-called "railroad flat." Fig. 1 illustrates the type heater which delivers the air horizontally.

A number of installations of such heaters was made in apartments of conventional layout. In all cases the heater location is always adjacent to a chimney, and provision is made for a direct flue connection so that no exposed flue piping exists. In Installation No. 1 the appliances which are installed consist of a 5 cu. ft. Electrolux, a gas range with automatic top and oven lighting, a 3000 B.t.u. input water heater and two Opalite gas lights. These were later additions, as it was found that the bathroom, which was quite some distance from the heater, had a temperature differential of approximately three degrees below the temperature in the other rooms and consequently additional heat was required. This was supplied very simply and economically by means of the Opalites which replaced the previous methods of illumination. A summary of the operating costs given in Table No. 1 indicates how well and economically this home was heated.

A five room installation is designated as Installation No. 2. In this case the heater was placed in the dining room with the thermostat on the other side of the living room wall. Such a location is very necessary in order to have good uniform heating throughout the entire apartment.

Installation No. 3 is a second floor apartment of a two-family house in which both apartments were previously heated by conversion burners in existing central-fired plants. During previous years the cost of heating this second floor apartment was $162, while the operating costs for the present season to date indicate a cost of approximately $100.

After the success of these three installations, it became evident that the heating comfort and convenience was so pronounced that it was wise "to go off the deep end" occasionally and a very unusual "railroad flat" was attempted. For this home Installation No. 4, the only available space for heating the rooms was in a very well planned and finished bathroom. In order to eliminate any possibility of overheating the bathroom because of the thermostat location in the hall, a second thermostat for limiting purposes only was located in the bathroom itself. At present a prospect is at hand with six rooms on two floors where the heater will be set in place of the register of the existing pipeless furnace. Data on other conventional installations is given under Installations Nos. 5 and 6.

A good many other installations could be mentioned showing the economies of this type of heating. The rea-

(Continued on Page 64)

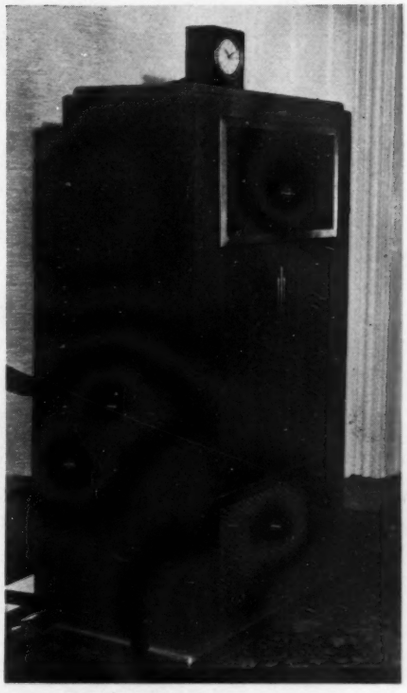


FIG. 1. Circulated direct-fired gas heater for residence.

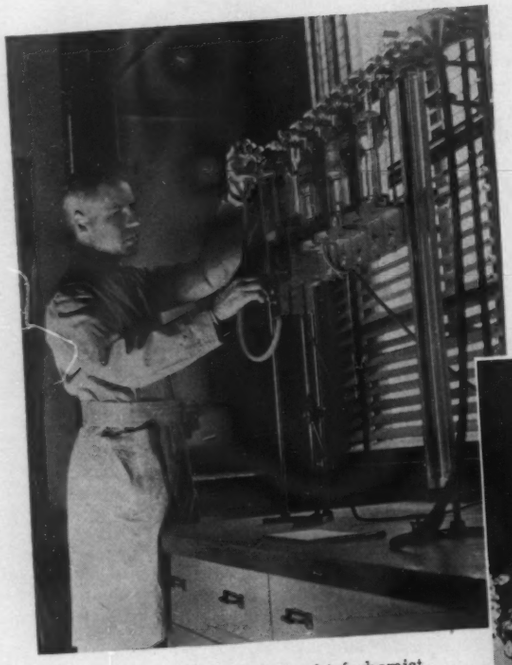
TABLE NO. 1. OPERATING RESULTS

Customer Installation	*Heat Loss Sq. ft. CIR*[1]	*Heater*[2] *Consumption*[3] *M cu. ft.*	*Degree Days*[2]	*Cu. ft. per Degree Day*	*Cu. ft. per Season (5926 DD)*	*Cu. ft. per CIR per Season*[3]	*Thermo per 1000 B.t.u. Heat Loss per Season*
1	131	152.6	9988	15.28	90.55	691	14.02
2	163	151.9	10037	15.13	89.66	550	12.45
3	236	150.5	5258	29.4	174.2	738	15.94
3a[4]	236	278.7	5355	52.0	308.2	1306	.....
4	150	53.2	4231	12.57	74.49	497	13.31
5	150	64.4	4616	13.95	82.67	551	13.03
6	196	115.9	5139	22.55	133.6	682	15.32

[1]Heat loss of entire premises, not merely the heated space.
[2]Data given is for the gas used for heating during the heating period expressed as the no. of degree days.
[3]Exclusive of gas used for domestic uses: cooking, refrigeration, water heating.
[4]3a is the same home as 3 during 1937-38 when it was gas heated by a conversion burner in a warm air furnace. The reduction in operating consumption is 43.5 per cent. The lower floor apartment is also gas heated by conversion burner in a hot water system. The operating consumption of this apartment increased 21 per cent since the fan cabinet heater replaced the conversion burner for heating the second floor apartment.

GAS Camera

One million man-hours of work without a disabling injury — that is the record established by the staff at Lone Star Gas Co.'s Petrolia compressor plant. **Ralph L. Shipp,** chief engineer in charge of the plant (left), receives a plaque awarded for this record from General Superintendent and Chief Engineer **Julian L. Foster.**



Portland Gas and Coke Co.'s chief chemist, **S. C. Schwarz,** pursues his activities in the company's research laboratory. The company's scientific investigations have resulted in large savings for its gas consumers through the development of valuable gas by-products.

Majordomos of Laclede Gas Light Co.'s sales group — in good humor over the upward sales trend of the past five months (from left to right): **George H. Schlatter,** general sales manager; **L. H. Spiner,** assistant to President L. W. Childress; **Robert Thompson,** Ruud Manufacturing Co.; **Robert Clark,** American Stove Co.

BELOW: The Program Committee for the Appalahian Gas Measurement Short Course which meets this month at the University of West Virginia (see page 62). SEATED (left to right): **Ray Hitchman,** United Fuel Gas Co.; **J. E. Overbeck,** Columbia Engineering Corp.; **J. R. Sproat,** Pittsburgh Equitable Meter Co.; **A. M. Hutchison,** Ohio Fuel Gas Co. STANDING: **C. H. Whitwell,** Equitable Gas Co.; **R. O. Borden,** American Meter Co.; **J. W. Sweeney,** Carnegie Natural Gas Co.; **A. F. Kraus,** Peoples Natural Gas Co.; **H. J. Wagner,** Public Service Commission of West Virginia; **W. A. Staab,** professor, and **G. R. Spindler,** director of extension courses, West Virginia University; **B. P. Stockwell,** Public Service Commission of West Virginia, Charleston.

Frank B. Long, vice president, Oklahoma Natural Gas Corp., announces the "Badger Fight," staged at the Frank Phillips' (Phillips Petroleum Co.) Woolaroc Lodge during the recent A.G.A. Natural Gas Department Convention in Tulsa, Okla.

THE CONSTRUCTION OF A LOW COST DEHYDRATION PLANT

By VAN THOMPSON
Southern Union Gas Company

THE pipe line system of New Mexico Gas Co. includes 25 miles of 6-in. pipe from the Ute Dome gas field to the Kutz Canon field; 92 miles of 10-in. and 46 miles of 12-in. to Albuquerque, N. M., and 58 miles of 8-in. to Santa Fe, N. M. Our maximum deliveries have been 13,000 M c.f.

The minimum temperatures at the fields in the winter are as low as 20° below zero.

In the winter months approximately one-half of our supply comes from each field, and until last winter flowed by natural well pressure to the markets at Albuquerque, Bernalillo and Santa Fe.

Every winter considerable trouble was experienced on account of hydrates forming in the pipe and at times completely plugging the line. Fortunately most of these freeze-ups occurred in the gathering lines where it was possible to remove them without any serious inconveniences to our customers. We did, however, put in a lot of sleepless nights blowing lines, building fires, injecting ammonia, depressuring our lines, etc., to remove the hydrates, none of these measures proving entirely satisfactory.

Last fall a 400-hp. Clark angle type engine and compresssor was installed at Kutz Canon in order to increase the capacity of our wells by carrying a lower working pressure on the wells at Kutz Canon and a lower discharge pressure on the 6-in. line from Ute Dome. Gas is brought into the compressor at an intake pressure of 200 lbs. and a maximum discharge pressure of 375 lbs. Under these conditions it was realized that substantially more hydrate trouble below the compressor station would result. After a thorough search of the literature and available information on the subject, including several discussions with companies which had dehydration plants, it was decided to design and build a calcium chloride dehyration plant at as nominal a cost as possible.

The dehydration plant was installed on the suction side of the compressor, where, although the pressure of the gas was only 200 lbs., the temperature of the gas was about 40° F. in the winter. Ordinarily about half of the gas is compressed, the gas from Ute Dome being bypassed around the compressor and discharged directly into the main line. Thus the gas from the Ute Dome field is not run through the dehydration plant. However, before next winter we plan to install another plant at Ute Dome which will lower the dewpoint of this gas to about 20° F. at 400 lbs., and we will then have the facilities to completely dehydrate all gas delivered.

At the present time we get a dewpoint of from 35° to 38° F. at the discharge of the compressor after the gases are mixed, which is sufficiently low to eliminate any hydrate troubles in our lines below the compressor.

A description of the equipment is as follows:

1. One absorption tower 30 in. by 12 ft. with two bubble trays and a peerless mist extractor in the top, equipped with a Hanlon-Waters direct connected float control with ¾-in. lever valve equipped with a ¼-in. single inner valve.

2. The high pressure storage was made out of 40 ft. of 12-in. pipe with a bull plug in each end.

3. The pilot controlled regulator was a Chaplin-Fulton regulator we already had in stock.

4. The back pressure regulator is a ¾-in. Fisher regulator.

5. All fluid lines are ¾-in. with the exception of the connections from the concentrator to the surge tank and gravitometer, which are 2-in.

6. We built the gravitometer, concentrator and boiler ourselves.

7. The boiler was made out of 15½-in. O.D. casing. The gravitometer is a piece of 6-in. pipe made into a float set inside of a piece of 8-in. pipe.

8. The air valve on our gravitometer came out of a humidifier.

9. Merco Nordstrom plug valves were used throughout.

The original plan was to pump the calcium chloride solution direct from the surge tank into the absorption tower. Later it was decided to put in

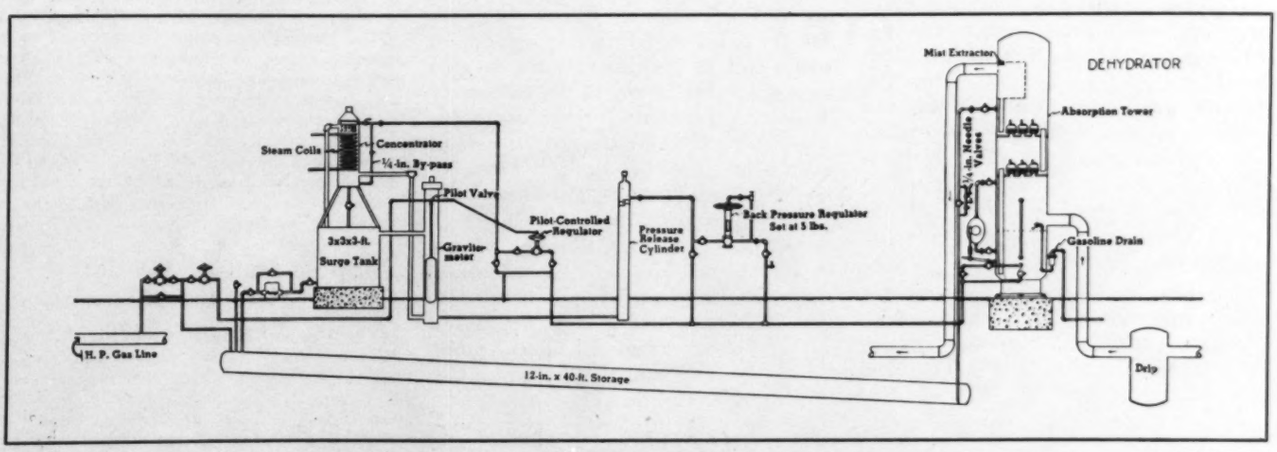


FIG. 1. A schematic diagram of the dehydration plant constructed by the Southern Union Gas Co.

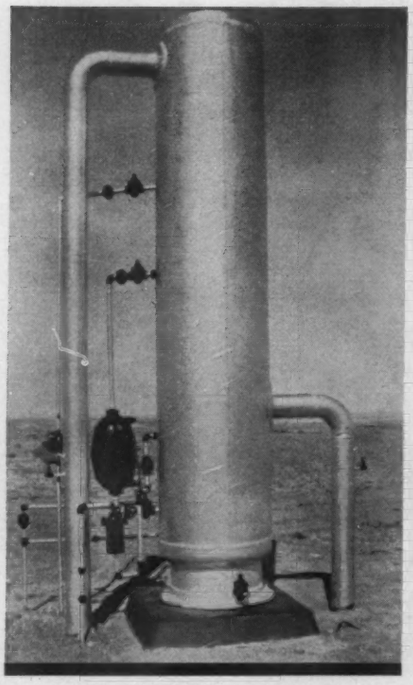


FIG. 2. Bubble tower and controls at the dehydration plant.

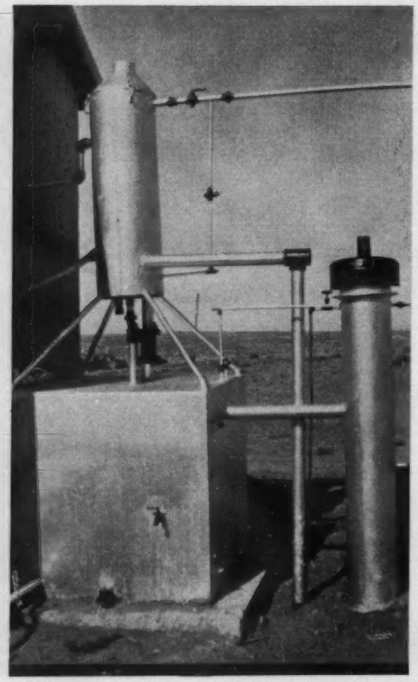


FIG. 3. Details of the concentrator, surge tank, and gravitometer.

240 gals. of high pressure storage in the ground, this storage being filled two or three times a day by a ¾-hp. electric pump from the surge tank. Then with the use of high pressure gas from the Ute Dome line or from the discharge of the compressor, the solution is passed from the storage tank through the tower. From the tower, part of the solution goes through the concentrator and returns to the surge tank. The majority of the fluid goes directly to the surge tank.

The gravitometer controls the amount of fluid circulated through the concentrator.

Cost: $2000 Minus

The reason that a dehydration plant was not constructed sooner was because it was thought that such a plant would cost at least $30,000. When the project was decided upon, it was not with the idea of building the best plant but one that would solve our problem with as little investment as possible. The total cost was less than $2000.

The tower was designed by company engineers and fabricated in Dallas. The regulators, float control, valves and pump were purchased from the manufacturers; the balance of the material was either bought locally or made in our own shop.

Fig. 1 shows a schematic diagram of the plant layout. The bubble tower and controls are depicted in Fig. 2, and details of the concentrator, surge tank and gravitometer appear in Fig. 3.

The dehydration plant was put in operation during the latter part of January. For the balance of the winter there were no more freeze-ups in our line below the compressor.

Some trouble was encountered with gasoline condensing in the absorption tower, and an Armstrong steam trap was installed to drain this off the calcium chloride solution in the tower to keep it out of the surge tank and concentrator. A drip was placed on the inlet of the tower, to trap any fluid in the pipe line.

The greatest trouble was in keeping the return line between the concentrator and gravitometer from plugging. We put in a 2-in. return line, raised the steam coil in the concentrator to give us a space for liquid in the bottom of the concentrator at all times and a ¼-in. bypass as shown on the sketch to keep brine from becoming too concentrated on low flow. We also installed a 2-in. bypass from the top of the concentrator down into the top of the surge tank to safeguard against losing brine in case lines should happen to plug. There is also a line (not shown on the sketch) running from the pump to the top of the concentrator. This line is used in pumping brine back over the concentrator from the surge tank in case we should need a lower gravity without waiting for the brine to circulate through the entire system.

We are controlling the brine flow with ¼-in. needle valves. Rate of flow is from 15 to 20 gals. of calcium chloride solution per hour. It is necessary to fill our storage tank twice a day, which means that we only operate our pump about three hours per day.

The operation of the plant is taken care of by the regular compressor operators. The plant has not been in operation long enough to enable us to secure from experience full information as to the cost of operation. Indications are, however, that it will be very small. Last winter we had several days with below-zero weather without any trouble below our compressor.

■ ■

United Pipe Line Co. To Sell the "Gulf South" To Industry

A LONG-RANGE campaign for the establishment of industries in the "Gulf South" has been launched by the United Gas Pipe Line Co., Houston, Texas, it was announced recently by N. C. McGowen, president. The purpose of the campaign is to attract new industries into the major parts of Texas and Louisiana, southern portions of Mississippi and Alabama, and northwest Florida, and to develop additional opportunities for industries that are now there.

A series of advertisements describing the natural resources of the territory are being run in four national periodicals: *Time, Business Week, Dun's Review* and *Manufacturers Record*. The Gulf South, meaning the territory served by the company's pipe lines, has been illustrated in the opening advertisement by a map outlining the territory. In succeeding advertisements, the term is being used as a tie-in device.

W. N. Ford, head of the company's industrial development department, is in charge of developing complete data on the industrial advantages of the region.

■ ■

New 23-Mile Line Will Give Pontiac, Ill., Natural Gas

The Public Service Co. of Northern Illinois, Chicago, having received approval from the Illinois Commerce Commission, has begun construction of a 23-mile gas main from Streator to Pontiac, Ill. The line, which will be completed late this summer, will also serve gas to Cornell, Rowe and Manville.

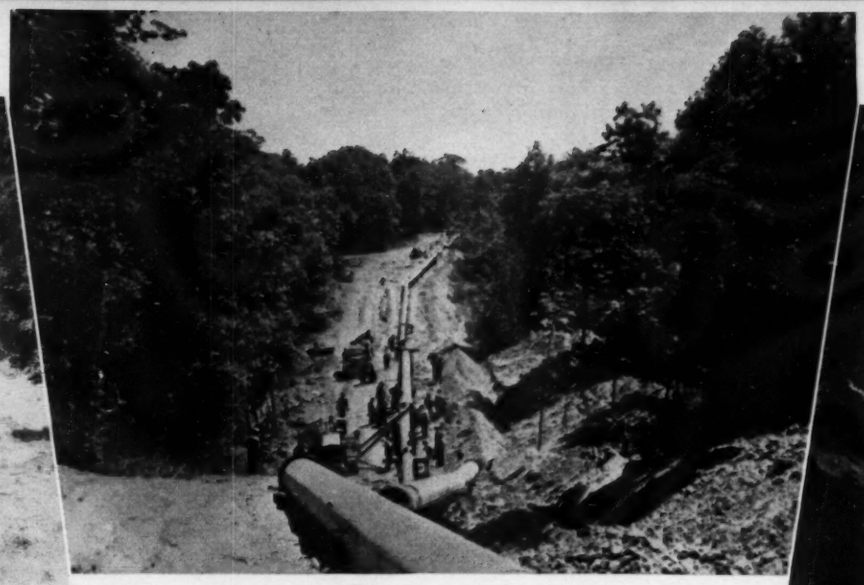
The Pontiac gas plant will be used as a standby source of emergency supply after the new main has been put in service. The new gas is to have a higher heating value than that now used and will be offered at reduced rates to the residents of Pontaic, according to officials of the Public Service Co.

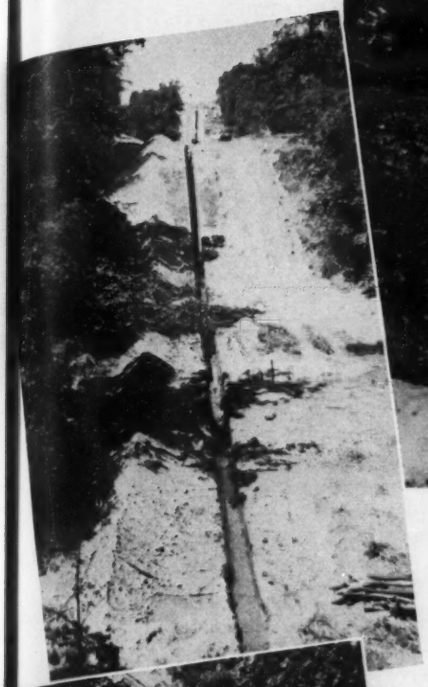
A survey has been made by the company to determine what appliance adjustment is necessary for the changeover.

■ ■

Peoples Natural To Serve Gas To Four Iowa Towns

The Peoples Natural Gas Co. of Omaha, Neb., has been granted 25-year franchises to serve natural gas to the towns of Hartley, Kingsley, Paullina and Marcus, Iowa. These four towns will be supplied gas through a main line soon to be constructed by the Peoples Natural Gas Co. from Sioux City. Iowa, to Minneapolis, Minn.





Michigan Gas Transmission

LOOPS ITS INDIANA LINE

THE construction for the Michigan Gas Transmission Corp. of 16 miles of 24-in. line in Indiana is partially completed. This line parallels the corporation's existing 20-in. line. W. S. Bibb, of Valley Parke, Mo., is the contractor. The contract also covers a multiple river crossing of two 16-in. lines paralleling the existing crossing in the Wabash River.

Pipe is being coated with coal tar enamel after application of two primer coats. The line is bonded and insulated so that cathodic protection may be used in the future if necessary. Both welding and couplings are being used in joining the line.

The photographs shown on this page were taken while the line was in process of construction and are published through the cooperation and courtesy of G. S. Young, vice president, Michigan Gas Transmission Corporation of Detroit, Michigan.

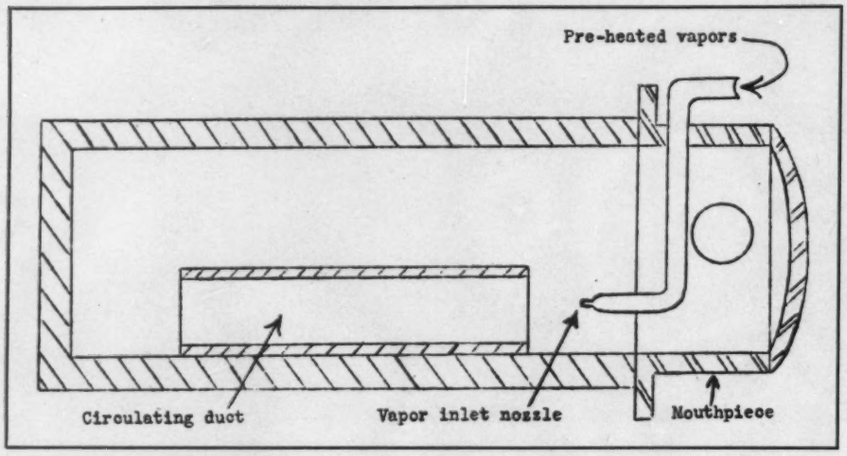


FIG. 1. Modification of retort to prevent carbon formation.

The Production of Oil Gas In Coal Gas Retorts

• HOMER T. HOOD, Michigan Fuel & Light Co., Battle Creek, Mich., in a paper, "Making Oil Gas in Coal Gas Retorts," presented before the Annual Convention of the Michigan Gas Association, Grand Hotel, Mackinac Island, Michigan, June 29, 30, July 1, 1939.—Abstract by G A S.)

THE two top retorts of the average horizontal bench may be conveniently and cheaply equipped to produce gas from oil and steam. The total gas-making capacity of the bench is increased about 50 per cent above the capacity when making coal gas only.

Practically no labor is required in the oil gas production. At present gas oil may be obtained in Michigan at a low price. The cost of the oil gas may be lower than the average cost of coal gas if the retort labor is included. There is no apparent reason why bench maintenance should be any higher for oil gas operation than for coal carbonizing.

This oil gas is of approximately the same specific gravity and burning characteristics as average coal gas, and the mixture of the two causes no trouble in the customers' burners. Oil gas statistics are shown in Table No. 1.

If a small coal gas plant needs increased gas-making capacity, either occasionally or continually, or if there is trouble in selling the output of coke at a satisfactory price, then the production of some oil gas would doubtless be profitable. The company has not yet made a study of the economy in changing over completely to oil gas.

Application for patents has been made covering the important details of this process.

In the first trials at the Sturgis plant of the Michigan Fuel & Light Co., steam at the temperature of saturated steam and cold oil were mixed in a tee, delivered through a mouthpiece connection and discharged at the back end of the retort through a 3-in. pipe lying on the retort bottom. When enough steam was used to prevent an excessive formation of carbon, a satisfactory retort temperature could scarcely be maintained when passing 5 gals. of oil per hour. It seemed desirable to pre-heat the steam and oil mixture and increase the hourly capacity, and at the same time avoid shocking the silica retort by contact with the comparatively cold mixture of steam and oil.

The steam and oil mixture was then pre-heated by passing it through pipe coils located in the recuperator ducts. It is necessary to properly proportion these heating coils so as to prevent the accumulation of carbon from the oil. With the vapors thus pre-heated, it was possible to pass about 7½ gals. of oil per hour per retort continuously and still maintain a satisfactory temperature. Temperatures of 700° to 800° were obtained by this method and the oil was completely vaporized.

When the vapors were liberated in the back end of the retort, the mixture drifted to the front in a non-turbulent stream. The central portion of the stream would not be heated as hot as those portions which contacted the sides and top of the retort. Also, the back end of the retort would be quite cold. about 1400°, while the front end would be hotter, up to 1800°. The formation of carbon could be reduced but not eliminated altogether, so that carbon gradually accumulated, and it was necessary to clean the carbon about once a week. Under these earlier operating procedures the color of the foul gas as it issued from the retort was practically black because of the carbon.

It was found expedient to prevent this carbon formation, as it seemed that whenever the plant foreman tried to raise the bench heats for a big production of gas, it was time to remove carbon. It was felt that what was needed was an active circulation of the gases inside the retort so as to make an even temperature distribution and to heat all portions of the mixture uniformly. A duct down the center of the retort out of fire clay tile was arranged. The pre-heated oil-steam mixture was blown into this duct at high velocity through a small nozzle located at the front end of the retort and pointing into the duct. By this recirculating process an improvement in the chemical reactions was made. The retort temperature appeared to be absolutely uniform from end to end. The carbon was no longer formed, and the color of the foul gas became yellow or amber like that which is proper for good coal gas operation. Fig. 1 shows this arrangement in cross section.

TABLE NO. 1. OIL GAS STATISTICS

Oil used—straw colored, completely distilled gas or fuel oil of 37° Be. or 7.0 lbs. per gal., price 4.3c per gal.
Average gals. of oil per M c.f.—5.7.
Average gals. of oil per day—168.
Average gas make per retort per day—29,500.
Increased gas make, oil gas vs. coal gas, per retort—18,500.
Per cent increased bench capacity one retort making oil gas—28%.
Per cent increased bench capacity two retorts making oil gas—56%.
Steam used per M c.f.—44 lbs.
Temperature of pre-heated mixture entering retort—750°.
Temperature of retort—1580°.
Gallons of tar per M c.f.—1.7 gals. (This figure depends upon the amount of oil used per M c.f. The more oil required, the more tar produced.)
When the bench is fired to maintain 1900° retort temperature in the coal gas retorts when carbonization is complete, the oil gas retort will show about 1550° to 1600° while making 29,000 cu. ft. of oil gas per day. (1900° coal retort temperature with 420-lb. charges.)
Cost of oil plus bench and boiler fuel, less tar credit, 27.9c per M c.f.

Looking at Industrial Sales Through a Salesman's Eyes

• **C. F. HENNESS, manager, industrial gas sales, Public Service Co. of Northern Illinois, Chicago, Ill., in a paper, "Approaching Industrial Sales from a Salesman's Standpoint Rather Than an Engineer's," presented before the American Gas Association, Natural Gas Section Annual Convention, Mayo Hotel, Tulsa, Okla., May 8-11, 1939.—(Abstract by GAS.)**

IN APPROACHING a plant which is a prospective customer, the industrial gas salesman has four fundamental problems confronting him:

1. How can he get into this plant?
2. Has he anything to sell the plant manager? In other words, can gas do his job in a manner which will satisfy the plant management and keep it satisfied?
3. If the job can be done profitably with gas, how can he convince the management of this?
4. How can he make the job work after it goes in?

Getting into a plant is usually the easiest part of the job. The fact that he is working for a company with the standing of the gas company in the community will usually open the door. The salesman should make the acquaintance of the top man in the organization at the start even though he will not have a proposition to lay before him until after the plant operations have been studied.

Listen Much; Talk Little

Once in the plant, the salesman should do a great deal of listening and very little talking. He should cultivate the acquaintance of men all along the line—from the workmen to the superintendent. He must find out what difficulties are being experienced in operations requiring heat, and the rank and file men are the ones who can tell him. He must build up his case not only on a cost basis but he must bring in all the intangible advantages which will benefit the over-all production costs. Salesmanship of a high order must be used to ferret out the value of the intangibles and later to get proper recognition in the final closing of the sale. It is during this investigation phase of the sale that some industrial men get lost. They may find some research phase of the problem so engrossing that they lose sight of the fact that every day of delay in closing the sale is costing both the customer and the gas company money.

When the salesman is formulating his case he must bear in mind that he is selling gas and not equipment. Many jobs have been delayed because of a preconceived idea that a big investment in equipment was necessary to make it successful; whereas, a gas burner properly applied to existing equipment would do the job at moderate cost. On the other hand, there have been jobs where attempted conversion of existing equipment was the most costly procedure which could be followed. The salesman should look at the problem with an open mind.

As soon as possible, the salesman should pick some key man in the organization who is in a position, if convinced of the value of gas, to help carry the burden of selling the idea to the plant management. Such a friend in the organization can help the salesman tremendously because of being able to see both sides of the picture better than the salesman. If the proposition is sound, he will in many cases give more weight to certain intangibles than even the salesman does.

If the salesman finds that he can't bite off a big chunk of business to start with, he should begin with a small one —the main idea being that he should not allow himself to get stopped.

In some instances the sale can come as the result of a clean-cut decision based on the salesman's proposal to the management without a great deal of plant contact. More often, however, it will come as a result of the salesman's piling up evidence and winning the confidence of the plant personnel.

Making the job work after it is in requires, essentially, a continuation of the methods which lead up to the sale; that is, working hand in glove with the plant personnel. It is assumed that the installation has been properly engineered, since, as stated at the outset, sound engineering is as important as sound salesmanship. The result is obtained by a proper dovetailing.

In spite of the best engineering skill, however, all new installations do not operate perfectly from the start. It is during this phase, particularly, that the foundation laid before the sale plays such an important part. If this foundation has been properly laid, the plant men feel that it is their responsibility to help make the job work rather than to adopt a "show-me" attitude.

Sharing Responsibility

Although the industrial gas man should not shirk his responsibility in giving the customer all possible assistance in getting the new installation into operation, he should not, however, attempt to carry the full responsibility but should get the plant men sold on the fact that the operation of the equipment is, after all, their job. As a matter of fact, they are usually proud of a new installation and anxious to regard it as their own "brain child." This frame of mind should be cultivated as much as possible throughout the entire selling procedure, which is entirely proper, since, in most cases, the plant men make valuable suggestions.

This puts the salesman in a position to move on to new situations where gas business is available. He must, however, keep an eye on his old jobs, not only in order to render assistance when required but also to see that some competitor does not arrive on the scene and do a better selling job than he. During this entire process the salesman has been dealing with a problem which, as far as its operating aspects are concerned, is an engineering problem. In order to achieve results, however, he has necessarily been working with men. Achieving results with men is a sales problem, whether you call yourself engineer or salesman.

CALENDAR

August

A. G. A. Home Service Conference — Chapman Park Hotel, Los Angeles, August 22-26.

American Dietetic Association — Ambassador Hotel, Los Angeles, August 28-31.

Appalachian Gas Measurement Short Course — University of W. Va., Morgantown, W. Va., August 21-23.

Maryland Utilities Association—Annual Fall Convention, Ocean City, Md., August 25, 26.

National Association of Railroad and Utilities Commissioners — Seattle, Wash., August 23-25.

September

Gas Industry Day — Golden Gate Exposition, San Francisco, September 9.

Pacific Coast Gas Association — 46th Annual Convention, Fairmont Hotel, San Francisco, Calif., September 6-9.

October

American Gas Association — 21st Annual Convention, New York City, October 9-12.

Empire State Gas and Electric Association — Annual Convention, Westchester Country Club, Westchester, N. Y., October 19-20.

Gas Industry Day — New York World's Fair, October 9.

Midwest Industrial Gas Sales Council — Palmer House, Chicago, October 26.

National Metal Congress and Exposition — Chicago, October 23.

National Safety Council — Atlantic City, N. J., October 16-20.

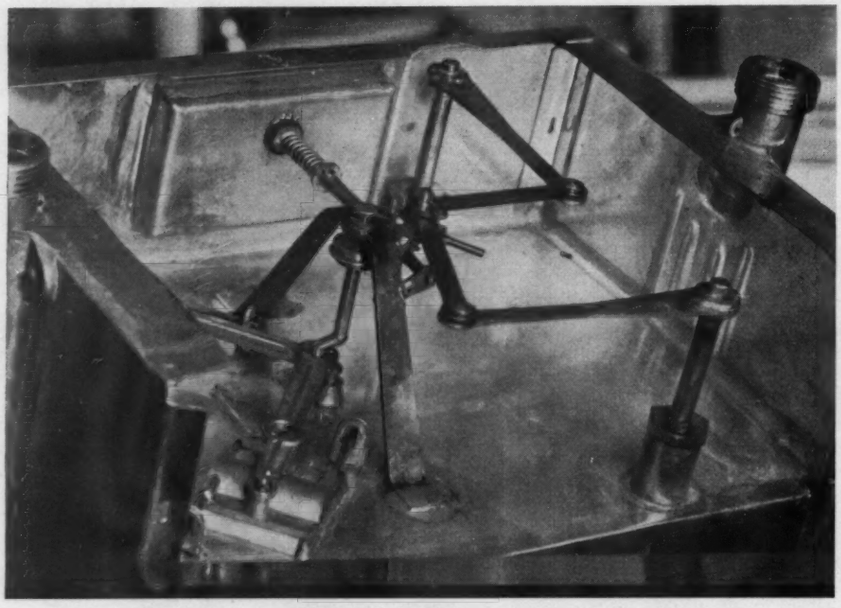


FIG. 1. General view of the top of improved tin meter.

Advantages of an Improved Open-Top Tin Meter

• H. S. HARRIS, Southern California Gas Co., Los Angeles, Calif., in a paper, "An Improved Open-Top Tin Meter," to be presented before the 46th Annual Convention of the Pacific Coast Gas Association, San Francisco, Calif., September 6-9, 1939.—(Abstract by G A S.)

NATURAL gas, as delivered to the consumer, is a remarkably clean fuel. However, many of the gas utilities, having changed from manufactured gas to natural gas, have encountered difficulties in their distribution systems due to the drying out of the rust deposits which were caused originally by the wet manufactured gas, and the meter, acting as a remarkably efficient dust trap, was decidedly affected. In an attempt to minimize this difficulty, the open-top tin meter was investigated.

The conventional tin meter with the back plate tends to track all dust going into the meter into the valve compartment, thence down into the diaphragm chambers, seriously drying the diaphragms. It was reasoned if the long channel, which connects the inlet tube to the valve chamber, could be eliminated, the velocity would be reduced to such an extent that any dust entering the meter would settle out on the valve table. Meters were constructed along this line, and under very drastic conditions of dust concentration, it was noted that in the case of the meter with the back plate, large quantities of dust were drawn into the diaphragm chambers, while with the open-top meter only a trace of dust was found in the diaphragm chambers. Thus it was believed the open-top meter could be a considerable benefit in increasing the time a meter could be of service.

After reaching this conclusion, further examination of the open-top tin meter indicated no serious difficulties were created, but several advantages presented themselves. If the index box could be closed in from the back with only sufficient clearance for the index drive shaft to rotate, then the index chamber would fill with gas, and there would be no further interchange of gas. Therefore, the index would be kept clean. This was found to be a considerable improvement over the older type meter, particularly in hot climates where the grease leakage extruded from the side stuffing boxes of the meter, vaporized and tended to contaminate the index. It is reasonable to believe with the closed-in index it would only be necessary to remove the index in rare cases for cleaning purposes.

Hole Size Increased

With only enough clearance for the index shaft, however, the manufacturer's problem of installing the index to such close tolerance presented a difficulty. Therefore the size of the hole was increased and a crude but satisfactory stuffing box was constructed, shown in Fig. 1.

Elimination of the back plate also eliminated the center or crank stuffing box. For many years it has been known that variable tension on this center stuffing box has been one of the bug-a-boos in maintaining good meter accuracy. If the stuffing box is installed with too much tension on the packing, the meter will tend to speed up after the tension is reduced, because less differential is required after the stuffing box loosens; therefore, the diaphragms are not distended to as great an extent as they are when the stuffing box is tight.

As shown in Fig. 1, just below the tangent there is a bushing installed in the bracket which holds the crank. This bushing is held in place by tacking with a small quantity of solder. When necessary to replace the crank or valve arms, a soldering copper is applied to the bushing, and when loose there is enough play so the crank may be lifted from the crank step bearing, and then, by removing the tangent, the crank may be taken out. This is a decided improvement over the conventional type meter, where it is necessary to remove the tangent, the king post bracket, and the angle plate in order to remove the crank.

When assembling the crank at the time of making repairs, a perfect alignment is easily and readily obtained. (Note in Fig. 1 to what a great degree the meter parts are exposed for observation.)

Another improvement is that it is much simpler to clean the table of the meter. Heretofore, in cleaning the top of the meter, solvent would carry some of the dirt down into the long channel where it would lodge, so with the exception of those meters which were boiled out at the time of rediaphragming it was almost impossible to obtain an internally clean, repaired meter.

The writer finds considerable merit in the scribing of the valve seat and cover, recently developed in the East. This practice permits a much closer timing job than can be accomplished by attempting to find the cut-off of the valve, inasmuch as the valve cut-off will vary somewhat by the angle at which the operator views the valve assembly. Scribing of valves and covers on tin meters of the conventional type with the back plate was tried, but

due to the slight bulge in the valve cover where the valve guide was molded in — also due to the minimized space — it was virtually impossible to detect the scribe marks. The open-top tin meter, by allowing more space to the valve chamber, makes it possible to scribe the valves and the valve covers.

With reference to repairing tin meters, it must be stated in all fairness — tin meters having spring-type side stuffing boxes and the double back plates have considerably simplified tin meter repair work, but with the open-top tin meter, and under actual test, repair time has been further reduced by approximately 15 minutes, and there has also been a small saving on solder and on soldering coppers. When it is necessary to change the crank or the valve arms, there is an increased discrepancy in repair time.

The open-top tin meter is not something new. At one time it was unsatisfactory, but development of the solder-seal index box and the compression-type stuffiing box adapted to the open-top meter now transforms the discarded meter into one of usefulness and possessing distinct advantages over the present type tin meter. The meter is apparently satisfactory from a laboratory viewpoint. It now remains to determine if field conditions will give similar results.

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Michigan Consolidated's New 22-Mile Line Started

Construction has begun on the 22-mile, 6-in. pipe line which will serve natural gas to the towns of Dexter, Chelsea, and Ann Arbor, Mich., it has been announced recently by C. R. Henderson, general manager of the Ann Arbor District, Michigan Consolidated Gas Co. The line will branch from the Texas line supplying the city of Detroit at a point near Carleton, Mich. Completion of the line is expected early this month, at which time changeover in the communities being served will be made.

Arthur Lerch and Edward Fischer, of Davenport, Iowa, are in charge of constructing the line. George Ludwig, of the Grand Rapids office of Michigan Consolidated, will supervise the changeover.

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A.G.A. Book Lists Rates, Gas Companies in U. S., Canada

The American Gas Association has issued its *A.G.A. Rate Service*, a 500-page, loose-leaf book of information relative to gas rate schedules throughout the country. Supplementary sheets, issued monthly, incorporate changes.

The book includes gas rates in effect for practically every community in the U. S. and possessions, Canada, and Newfoundland, and information on heating value and type of gas supplied; a list of gas companies and the communities they serve; names of companies having special rates for water heating, refrigeration and air conditioning, and companies and communities using thermal rates.

Flow and Pressure Drop Data For Cloth Dust Filters

• **C. W. CAPWELL, San Diego Consolidated Gas and Electric Co., San Diego, Calif., in a paper, "Flow and Pressure Drop Data for Cloth Type Dust Filters," to be presented before the 46th Annual Convention of the Pacific Coast Gas Association, San Francisco, Calif., September 6-9, 1939.—(Abstract by G A S.)**

THE San Diego Consolidated Gas & Electric Co. has standardized on a dry type dust trap with a cloth bag for the filtering medium, similar to those used by some other companies (see Fig. 1). Such traps are ordinarily installed ahead of district regulators and on large customer installations. (For details of trap construction see "Elimination of Dust," by C. W. Capwell, Page 98, Volume 29, P.C.G.A. Proceedings.)

The filter bag is made of Pequot sheeting. Usually two or three bags are placed over the cartridge framework to assure complete filtration of the dust. The amount of dust collected in the trap may be determined by removing the inspection hole plug and making a visual inspection with a flashlight.

The traps are provided with a circular brush, externally operated, to strip the dust adhering to the bag. As shown (Fig. 1), this brush is circular and fits over the filter bag. To operate the brush, the trap is isolated from the line by closing the inlet and outlet valves; then the brush is run up and down the bag, loosening the dirt, which falls to the bottom where it is removed at the clean-out. While the bag is being brushed, the outlet valve of the trap is cracked. This balloons the bag and makes the brush more effective.

Purpose of Tests

The purpose of the tests described in this paper were:

1. Determine pressure drop (differential) across the trap at various rates of flow with one, two, or three clean filter bags; also with no filter bags.

2. Determine effect on flow when dust is injected into trap.

3. Determine effectiveness of brushing bags coated with dust.

The trap selected for the test was of the type shown in Fig. 1. This trap has 2-in. inlet and outlet connections and an 8-in. diameter cartridge, 28 in. long with a filtering area of 700 sq. in. The shell is 12 in. in diameter and 48 in. long.

This trap was placed in series with an orifice meter and a dust injector. Thus, it was possible to determine the flow through the trap and to admit the amount of dust desired for the tests. Manometers were connected to determine the pressure drop across the trap and to show the gage pressure at the inlet of the trap.

Tests were run on the trap with one, two, and three clean bags placed over the cartridge, using clean gas. From these it was observed that there was very little difference in pressure drop. Consequently, a test was made with the filter bags entirely removed. The results of this test are shown in Fig. 2. It was quite apparent that the presence or absence of bags on the cartridge contributed very little to the total drop through the trap, as the curves for the four tests were practically identical.

The tests using dust were made by starting with three clean bags and a constant flow of 10 M c.f. per hour maintained at 5 lbs. per sq. in. inlet. The pounds of dust injected were plotted against the drop across the trap in lbs. per sq. in. As the bags loaded up, they were periodically brushed and the corresponding decrease in differential noted.

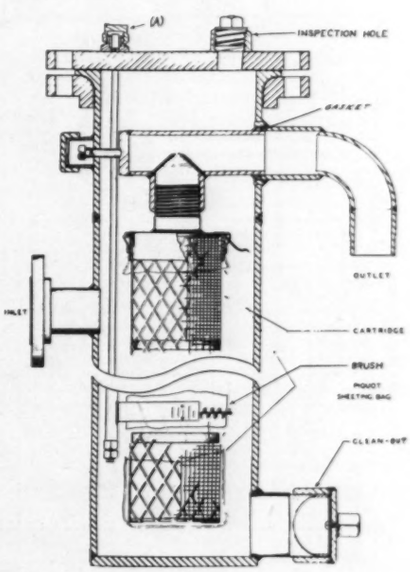

FIG. 1. Dry-type dust trap with cloth bag filter.

It will be noticed that all of the curves in Fig. 3 flatten out at 4.32 lbs. per sq. in. There was some back pressure on the discharge line, and when the drop reached 4.32 lbs. per sq. in. it was no longer possible to maintain 10 M c.f. per hour through the trap; that is, additional dust reduced the flow.

From Fig. 2 the equation for the drop across the trap at 5 lbs. inlet was found to be

$$.0583y = x^{2.05}$$

where x is the flow in M c.f. per hour and y is the drop in inches of water column. For other inlet pressures, the coefficient of y will change, but the exponent of x will remain at 2.05. (It was noted that below three M c.f. per hour, the relationship varied somewhat from the above equation.)

From the group of curves in Fig. 3 it appears that a straight line, as shown by (a), may be assumed to be the curve for the performance of the trap. The equation of this line is

$$y = 0.29x + 0.3$$

where x is the lbs. of dust injected and y is the drop across the trap in lbs. per square inch.

When dust has been deposited on the filter bag, the relationship between flow and differential is similar to the relationship when the bag is clean. For example, the equation for drop across the trap when 7.5 lbs. of dust have been deposited is

$$0.257y = x^{1.235}$$

where x is the rate of flow in M c.f. per hour and y is the pressure drop in inches w.c.

When the flow was stopped and then started again, the drop across the trap was reduced. This was probably due to dust particles falling from the bag.

Brushing the filter bag with a slight back pressure on the cartridge will greatly extend the time for complete servicing of the trap.

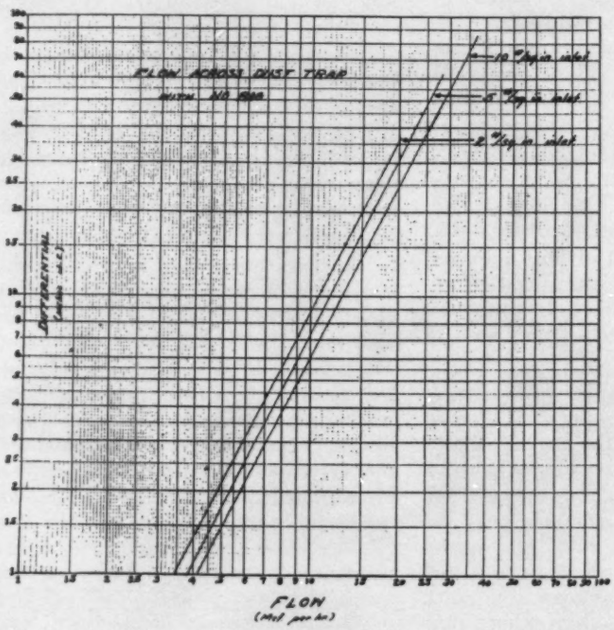

FIG. 2.

Flow across dust trap with no bag.

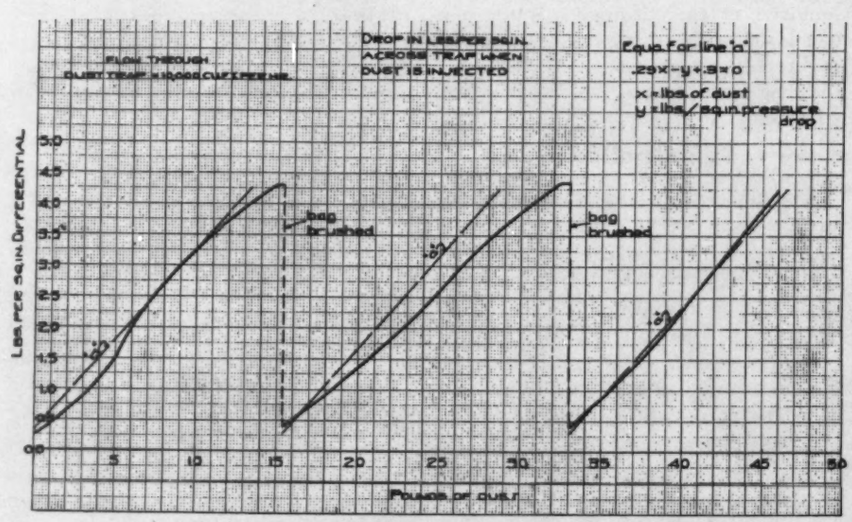
FLOW THROUGH DUST TRAP = ACROSS DIFFERENTIAL
DROP IN LBS PER SQ IN ACROSS TRAP WHEN DUST IS INJECTED
Equa for line "a"
.29x-y+.3=0
x = lbs. of dust
y = lbs./sq.in. pressure drop
LBS. PER SQ. IN. DIFFERENTIAL
bag brushed
bag brushed
POUNDS OF DUST

FIG. 3. Test data using dust-laden gas with three filter bags on the dust trap.

Indiana Co. Seeks to Issue Bonds in Refunding Move

Authority to issue $45,000,000 in bonds and $6,000,000 in serial debentures or notes was requested in a petition filed with the public service commission recently by the Northern Indiana Public Service Co., Hammond, Ind. This action marked the first step in the refunding program of the utility, which serves gas to 54 communities in the 12,000 square miles of territory north of the Wabash valley and from the Indiana-Illinois state line to the Indiana-Ohio state line.

It is proposed that the bonds and serial debentures, or notes, be sold for the purpose of obtaining funds sufficient, with other funds in the company's treasury, for calling and redeeming the bonds now outstanding. The estimated cash saving in interest and sinking fund will approximate $200,000 annually, according to Dean H. Mitchell, president of the utility.

New Mexico Gas Co. Builds 31-Mile Line To Belen

The New Mexico Gas Co., Santa Fe, N. M., has begun construction of a 31-mile gas main from its measuring station at Albuquerque to Belen, N. M., through the town of Los Lunas. According to J. R. Cole, vice president, the line and distribution system will be completed before the beginning of this year's heating season. The company recently secured franchises in the two towns.

Belen, Valencia County, has a population of 3500, and Los Lunas 1500. The highway from Albuquerque through Los Lunas to Belen is bordered with small trucking farms, which will also be served by this line.

Flowers Elected President of Michigan Gas Ass'n

Dean W. Flowers, Michigan Consolidated Gas Co., Muskegon, Mich., was elected president of the Michigan Gas Association at its annual convention held at Grand Hotel, Mackinac Island, June 29-July 1. Fred P. Cope, Consumers Power Co., Saginaw, Mich., was elected vice president and A. G. Schroeder re-elected secretary-treasurer. Approximately 350 men and women attended.

Power Commission Seeks To Unify Utility Accounts

Gas companies are receiving from the Federal Power Commission a proposed draft of a new uniform system of accounts. A new system will be inaugurated on January 1, 1940, and gas companies are invited to submit their suggestions and comments.

New Building Heated by Gas

Gas heating equipment is being installed in the $30,000 Blue Earth county highway building in Mankato, Minn. The building is nearly completed.

Portable Detector For Small Concentrations of CO_2

• JOHN G. WILLIAMSON, Southern California Gas Co., Los Angeles, Calif., in a paper, "A Portable Detector for Small Concentrations of Carbon Dioxide," to be presented before the 46th Annual Convention of the Pacific Coast Gas Association, San Francisco, Calif., September 6-9, 1939.—(Abstract by G A S.)

THE Natural Gas Bureau Appliance Testing Laboratory of the Southern California and Southern Counties Gas companies recently developed an instrument for detecting the presence of small concentrations of carbon dioxide such as might be found in the air discharged from the register of a furnace with a leaking combustion chamber or fire-box.

The development of this instrument was based on a bulletin issued recently by the engineering department of the Travelers Insurance Co., of Hartford, Conn., which gave instructions for building a carbon monoxide estimator, which burned the carbon monoxide to carbon dioxide and determined the quantity of the latter.

The principle of the operation of the carbon dioxide detector is that of the reaction of carbon dioxide with strontium hydroxide. By means of an ordinary bicycle pump, the atmosphere to be sampled is drawn through a measured volume of strontium hydroxide solution (0.0004 normal) containing phenolphthalein as an indicator, which gives the solution a reddish color. The gas sample is bubbled through the test solution until the latter becomes colorless, at which time the end-point is reached. The number of pump strokes necessary to displace this color is noted. Fig. 1 shows an experimental model.

A definite amount of carbon dioxide is necessary to neutralize a given volume of test solution. Therefore, in an atmosphere of high carbon dioxide concentration, just a few pump strokes are necessary to introduce this quantity of carbon dioxide, whereas in an atmosphere of lower concentration a greater number of pump strokes are required. Consequently, the concentration of carbon dioxide in the sample is inversely proportional to the number of pump strokes.

The constructional features (Fig. 2) of the instrument are (1) a bottle for storing the test solution; (2) an aspirator bulb for raising the solution into (3) the measuring chamber which is designed to deliver a constant volume of test solution (approximately 20 cc.); (4) a valve between the measuring chamber and (5) the testing chamber in which the reaction occurs; (6) a sampling pump for pulling the sample through (7) the sampling line; (8) a pair of check valves used with the pump; and (9) two absorption tubes filled with soda lime to prevent any contamination of the test solution by carbon dioxide from room air. These various parts are connected with glass and rubber tubing.

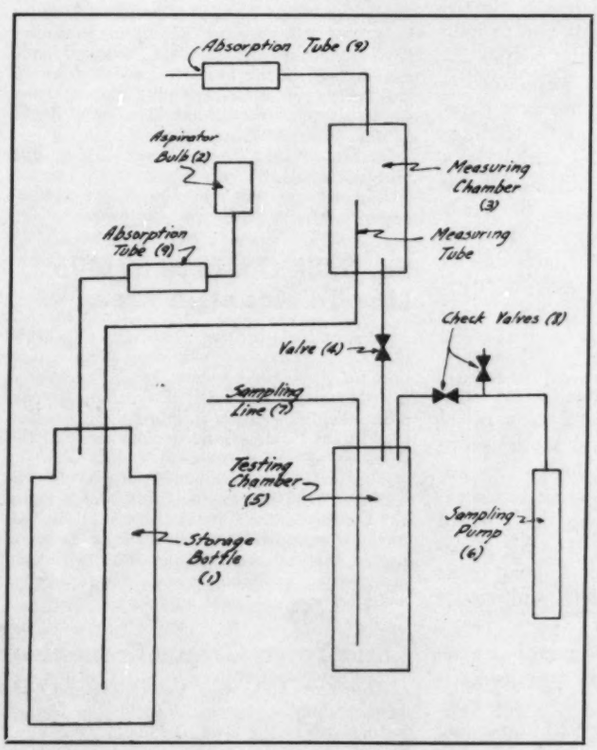

FIG. 2.
Flow diagram of the portable carbon dioxide detector.

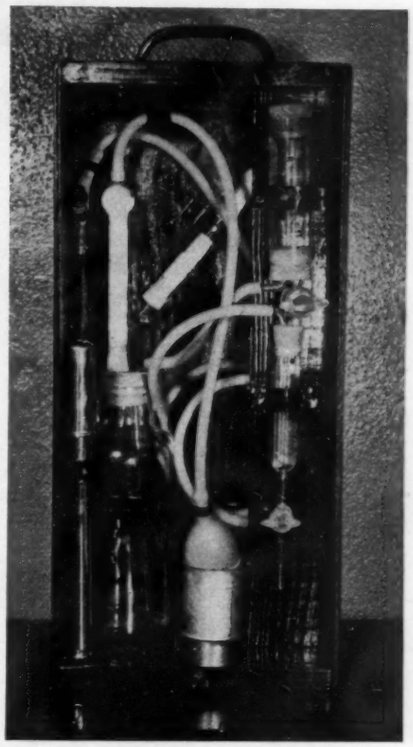

FIG. 1. An experimental model of the carbon dioxide detector.

The operating procedure for the instrument is as follows:

1. Close valve (4).
2. Gently squeeze the aspirator bulb (2), forcing the test solution above the measuring tube in the measuring chamber. When the bulb is released, the excess solution will drain back into the storage bottle.
3. Purge the testing chamber and sampling line with the gas to be sampled (approximately 15 strokes are necessary).
4. Open valve (4). The solution must be drawn into the testing chamber by means of the pump. While doing this the liquid seal between the sampling line and the test solution should not be broken.
5. Close valve (4).
6. Slowly bubble the gas sample through the test solution. The pump should be operated at a steady rate, permitting bubbling to cease between successive strokes. The number of pump strokes necessary to reach the end-point should be noted. (If more than 50 pump strokes are required, the concentration of carbon dioxide in the sample can be considered negligible.)
7. Drain the testing chamber. The instrument is now ready for a second sample.

It is possible to use this instrument for approximate quantitative determinations by calibrating the number of pump strokes necessary to reach the end-point against the concentration of carbon dioxide. With further field experience, the scope of this instrument may be extended to other uses.

An Educational System For Field Service Employes

• **R. L. NANCE, Coast Counties Gas and Electric Co., Santa Cruz, Calif., in a subcommittee report, "Appliance Testing and Employe Training," to be presented before the 46th Annual Convention of the Pacific Coast Gas Association, week of September 4, 1939.—(Abstract by G A S.)**

THE training of employes in the Coast Counties Gas and Electric Co. presents quite a problem, due to the wide spread of territory. Service men are required to service all gas-burning equipment and their controls, which requires at least a working knowledge of electricity. Due to the rapid strides made in forced-air heating, it has only been through the cooperation of the manufacturers that service men have been kept up to date in the proper servicing of this equipment.

All service men have been through the company training schools, regardless of the length of time they have been employed and they realize that it is only through constant effort and learning on their part that the service department will be kept up to date.

All new service men have been selected from the construction crews, so when new men are hired for construction work, every effort is made to procure men of the proper type. This not only gives us a chance to observe their working qualities but gives them experience in distribution work on mains, new services, motor locations, and the correct setting of meters and regulators.

Preliminary Training

If, after six months or more of this work, a man develops an interest and has some aptitude for service work, he is placed in the meter and regulator repair shop. Here he is under constant supervision and observation and learns the proper use of tools, meter repairing, meter proving, capacities of all meters and regulators, and the repairing and testing of all regulators. This period of training lasts from 90 to 120 days, depending entirely upon the individual. After the completion of this training, he is given a questionnaire covering meters and regulators. This questionnaire is checked and any mistakes made are called to his attention and the correct answer is explained.

The next step is to place him on duty with the best trained service men. At the present time five men are used for this work, and they have been selected because of their dependability, knowledge of appliances, and aptitude in handling irate customers. The student is to observe all the actions and work of his trainer and to make sure he understands all the reasons for the manner in which the work is completed. At no time is the student to make any comments to the customer or make any adjustments until it is felt he is capable, at which time the senior service man becomes the observer. The student also does the driving and has the care of the truck and equipment as his responsibility.

Each senior service man is given a "student's aptitude record," to be filled out by him and turned in to the service supervisor. The reports made are compared and discussed by the service supervisor and district superintendent, and if the student has a weakness, he receives training on this particular problem. The amount of time spent with the senior service men varies as to the individual, but at least 90 days, total period, are required for the best results.

During this time the service supervisor gives the student classroom instructions on all thermostats, timeostats, heat controls, details for proper wiring of electrical controls, proper installations, and burner adjustments. The Electrolux cycle is gone over carefully, and the student is taught to diagnose the trouble by feel, which is a simple procedure if he knows what the correct temperatures on a perfectly operating unit should be, and the conditions under which the Electrolux is operating. Cut-away models of controls are used to demonstrate the manner in which they operate, and how the adjustments are made.

After this training has been completed, the student is used as a relief service man and his field work is observed and checked by the service supervisor. The "questionnaire for service men" is filled out by the student and corrections are called to his attention. Every effort is made to keep these questionnaires up to date and revise them whenever necessary.

After a student service man has been on his own for about six months he is put on house survey work, which consists of going from house to house and servicing all the appliances. This work seems to give him the experience needed. So he will have no difficulty in gaining entrance to the customers' homes, letters are mailed by the local office, informing them of the intended call and its purpose.

Each truck is equipped with a metal record chest that is used for filing all instructions and reference literature; A. G. A. books covering all controls; service manuals; piping installations; and wiring diagrams that are obtained from the various manufacturers. Charts showing orifice capacities from 4 in. to 8 in. W.C. pressure and drill size from ½ in. to a number 80 drill are furnished.

Service Bulletins

Instructions which change procedure on service work are issued in the form of a service bulletin. These are issued in numerical order and are recalled when they become obsolete. Each service man carries a complete set of these service bulletins in the record chest.

Every effort is made to secure cut-away models of any new controls as soon as they are available, and these are discussed at district meetings held by the service supervisor.

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Pipe Line Company Plans To Build 130-Mile Line

The General Gas Pipe Line Corp. Indianapolis, Ind., has recently applied to the Federal Power Commission for permission to construct a natural gas line from central Kentucky into central Indiana. The proposed 20-in. line would be approximately 130 miles long, and would bring gas from Kentucky fields for wholesale only to industrial companies and utilities at rates varying from 30 to 33 cents per M c.f. The pipe line company would also construct about 40 miles of 3-, 4-, 6-, and 8-in. gathering lines.

In January, 1939, the General pipe line company applied to the Commission for permission to construct a similar line, but withdrew its application before the hearing.

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So. Calif. Co. Lays 30-Mile Line To Mountain Area

Construction of the Southern California Gas Co.'s (Los Angeles) new 30-mile pipe line to serve home-owners in 11 additional districts along the crest of the San Bernardino mountains began in late July, according to William P. Hand, division manager of the company at San Bernardino, Calif.

The total cost of the new project is estimated at $158,000. Pacific Crane and Rigging Co. are the contractors, and the line is scheduled for completion within 60 days. It is expected that all these communities will have gas service available within 30 days after completion of the new pipe line.

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Ohio Town Grants Franchise

The East Ohio Gas Co., Cleveland, has been granted a two-year franchise to furnish natural gas to the town of Poland, Ohio.

Some Problems in Servicing the Gas Heating Customer

• **E. W. CHRISTELL, Peoples Gas Light and Coke Co., Chicago, Ill., in a paper, "Home Heating Service Problems," presented befor the Technical Section of the Indiana Gas Association 29th Annual Convention, Fort Wayne, Ind., May 8, 1939.—(Abstract by G A S.)**

THE time, effort, patience and tact used by the salesman in convincing the prospective customer of the advantages, conveniences, and comforts of gas for heating should always be considered by those who engineer the installation of the appliance and service it after the sale has been made. It is their responsibility to see to it that the installation and performance of the appliance and heating system will give the customer the service and benefits which they were informed they would obtain.

In order to insure the user of complete satisfaction, it is essential that the heating equipment be installed and adjusted so that the maximum overall heating efficiency will be obtained and also that it will be as free as possible from service difficulties. This cannot be accomplished unless the following conditions are checked into carefully by the engineer and corrections made wherever necessary.

1. The gas home heating equipment should be sized very carefully after taking into consideration the following factors:
   a. Heat loss of the home.
   b. The size and operating characteristics of the heating appliance which should be somewhat oversize.
   c. The size of the present heating plant.
   d. The design of the existing heating system (radiation, piping, duct work, etc.).
   e. Relative application of the heating system to the particular home or building.
   f. The type of thermostat being used.
   g. Customer operation.

2. The present heating system should be checked carefully against the maximum hourly B.t.u. loss to determine whether the existing radiation is sufficient. On hot water or steam installations, the satisfactory operation of the heating system depends greatly upon the proper sizing and installation of hot water and steam mains, risers and returns, consequently the piping should also be inspected to be assured that the system will function without any difficulty. On gravity or forced warm air systems, the leaders or ducts, register size and location, cold air return grill location and size, and size of wall stacks must be checked to be certain that proper heating will result. When radiation is insufficient or piping or ducts improperly sized and installed, arrangements should be made to have conditions corrected in order to avoid any possible heating complaints after the installation of appliance.

3. On steam, vapor and vacuum jobs the air vents on both radiators and return lines should be checked for defective or improper action, to be certain that radiators will heat properly and circulation will be satisfactory.

4. Chimney condition should be carefully inspected to determine whether the installation of a liner is necessary.

5. Where a water coil or heat exchanger is used in a furnace or boiler, an effort should be made to have it removed in order to improve the hot water service to the customer, and to keep from lowering efficiency of the heating plant.

6. The controls or devices used in connection with the existing heating system should also be inspected to determine whether they will continue to give satisfactory service.

7. Where a conversion burner is to be installed in a warm air furnace, it is advisable to completely reset the furnace before burner installation in order to avoid any possible trouble due to leakage of flue products. The installation of the heating equipment should be made in accordance with manufacturer's installation instructions, A.G.A. requirements, and local practices. The following point should not be overlooked in the inspection procedure:

A gas cock or valve should be installed in the main gas line at the inlet of the gas pressure regulator and should have provisions for pilot connections so that main valve can be kept closed while lighting the pilot. This point is very important, since in so many cases the pilot gas line is taken off after the main gas cock, and as a result the possibilities of the customer lighting the appliance improperly are increased to a considerable degree.

After the installation of the heating equipment, probably the next most important work is the adjustment of the various controls used. Considering that during the past season approximately 45 per cent of the service calls received on home heating appliances were caused by the improper operation of the controls themselves, it is quite obvious that in order to avoid future service calls exceptional care should be taken when checking or making the original adjustments on these controls, in particular the thermostatic pilots. Service requests on thermostatic pilots alone represented about 19 per cent of home heating service calls made by the company during the last heating season.

While it is not advocated that adjustments should be changed promiscuously, it is felt that the original control adjustments cannot be taken for granted as always being correct, even though the adjustments are generally accurately set at the factory.

The setting of the maximum gas input to the applicance so as to obtain the highest overall heating efficiency and the consequent maximum operating cost must not only be based on the heat loss of the home but must also be regulated so that the heating system will provide heat from a cold start in a reasonable period of time. Unless the correct heat input is obtained, the overall heating efficiency is lowered, and the operating cost increased. This applies to gas designed jobs as well as conversion burners.

The primary and secondary air to the central heating appliances should be regulated with the aid of an Orsat in order to obtain an adjustment that will give the highest possible combustion efficiency. Where the secondary air cannot be adjusted, it may be necessary to install an orifice in the vent collar or a draft hood with an adjustable vent inlet in order to reduce the excess air to a minimum. This procedure is often necessary even though the appliance may be set at rating. It would appear that any heating appliance when set at rating should be so designed that it would be unnecessary to restrict the vent outlet in order to obtain a satisfactory flue gas analysis. However, this generally is not the case and orifices or the adjustable type draft hoods are often used to reduce the excess air and to obtain a satisfactory flue gas analysis. On conversion burner installations, baffling the boiler or furnace flue passages may be necessary in order to direct the flow of the flue gases so that maximum scrubbing action with all the heating surfaces beyond the firepot will be obtained. By directing the flue gases in this manner short cutting and channeling of the flue gases are eliminated to a great extent and the efficiency of the installation is increased.

The Customer's Instructions

While the greatest importance must naturally be attached to the inspection and adjustments of the controls and the proper installation of the appliances, stress should also be placed on the instructions given the customer relative to the operation and the maintenance of the heating system. Unless the customer understands the correct use of the appliance and controls, he cannot hope to obtain the best possible service from it. The operation and lighting of the heating system should be gone over carefully with the customer, and an effort made to induce him to light the appliance himself.

Unless this practice is gone into in detail, the possibility of preventing light up and shut down requests will be very limited. Detailed lighting instruction cards should be installed on every appliance in a very conspicuous place and should be referred to and followed carefully by the engineer or serviceman when instructions are given to the customer. This card should contain detailed information regarding the correct procedure to follow when lighting and should also include information regarding the oiling of motors, filling of boilers with water, care of air filters, filling of humidifying pans. venting of hot water radiators, etc. While this information may not be 100 per cent effective, it does help materially to reduce complaints.

Unfortunately in probably the majority of cases the man of the home is not in at the time the final inspection of the appliance is made, consequently verbal instructions on the lighting of appliance and its maintenance and operation with the lady of the home generally are not quite as effective. It is important that verbal instructions be supplemented by written instructions in the form of lighting instruction cards and general instructions on the operation of equipment so as to obtain greater fuel economy. The following points should be discussed with the customer in detail.

1. Operation of the thermostat and registers or radiator valves when windows are open. The registers or radiators in rooms that are to be cooled during the night should be shut off. If the home is being aired out, the thermostat should be turned down. Bedroom doors should be closed at night when windows are open.

2. Fireplace dampers should be kept closed when fireplace is not in use.

3. Insulation and its effect on operating costs.

4. Storm windows and their effect on operating costs.

5. Venting of hot water radiator vents periodically to eliminate air which accumulates at the top of radiator. Air valves on steam systems should also be inspected periodically to be sure air is being vented from radiator properly.

6. Radiator covers and their effect in the free air circulation through the radiator. The relative efficiency of the various types should be pointed out.

7. Operation of thermostat. This is perhaps the most important point of all and should be discussed in detail with the customer, since some people are of the belief that by setting the thermostat higher than the desired temperature they will cause the heat to come up more quickly.

In connection with the problem of lighting up central heating equipment it is felt that more consideration should be given to this matter. While stress has constantly been put on the importance of simplifying the lighting procedure, so that any individual can light the pilots, there are still any number of appliances being introduced which are so difficult to light that it would be impossible to expect the customer to perform this operation. During the last heating season approximately 20 per cent of complaints were requests for light ups and six per cent for shutting down the appliance. This represents a large proportion of service calls, and while these have been reduced to some extent each year through customer education at the time of each service call and at the time of the annual inspection, light up calls will probably never be eliminated entirely unless the methods of lighting are made simpler.

Conclusion

The number of service calls received has been dropping each heating season due to better customer understanding of operation of equipment, improved design of controls and appliances, and more experienced engineers and servicemen. In order to accelerate this decline in service calls it is felt that the following problems should be given further consideration by the appliance manufacturers:

1. As previously cited about 26 per cent of the calls received during a heating season are requests to light up and shut down the consumers' gas heating appliances. A good number of the appliances sold today are not equipped with lighting and operating instruction cards. In those cases where they are provided, the instructions are generally inadequate. Service requests of this type cannot be reduced to any degree unless detailed lighting operating instructions are supplied with each appliance.

2. Customers request light up service principally because the pilots are usually located in positions that are not readily accessible for lighting. In many cases the customers refuse to light appliances because they feel the procedure is too complicated. Outside lighting systems should be used unless the pilots can be installed in locations that are accessible.

3. Servicemen are required to know the operation and adjustments of the controls made 10 years ago as well as the modern present day controls. The question of keeping servicemen trained and informed on the equipment to be installed in the future could be greatly simplified if each appliance manufacturer would attach a service sheet containing the wiring diagram and cross sectional views of the controls installed somewhere on the appliance, such as on the inside of the control compartment inspection door. If this procedure were followed, the servicemen would never be without information on the equipment being serviced.

4. The utility is dependent upon the manufacturer for information regarding the servicing, adjustment and maintenance of their heating equipment. Several manufacturers have prepared training manuals or service manuals in the past on their equipment and these have been of exceptional help during training periods and on servicing work. Unfortunately in many cases manufacturers have not prepared such manuals, and have left it entirely up to the dealer or utility to discover for themselves how the equipment operates and the servicing problems with which they are faced.

Every manufacturer should furnish his dealers and the utilities with such manuals so as to enable them to train their servicing organizations in the proper maintenance of equipment.

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Consolidated Gas Utilities Builds Compressor Station

The Consolidated Gas Utilities Corp., Oklahoma City, has let a contract to Clark Bros., Tulsa, for construction of a 1200-hp. compressor station seven miles north of Shamrock at Twitty, Texas. Three 400-hp. L-type Clark Bros. units will be installed. The L. L. Dresser Engineering Co., Tulsa, has the subcontract for erecting the building and installing the equipment.

Construction was scheduled to start July 24, with C. S. Worley, engineer and superintendent of compressor stations of the Consolidated Gas Utilities Corp., supervising the construction and installations. The contract calls for delivery of the new station to the company by October 1.

The new compressor station will increase the pressure and volume of gas taken from the Wheeler County field, carried in the lines which serve Oklahoma and Kansas.

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Federal Power Body Grants Temporary Export Order

The Federal Power Commission has issued a temporary order extending to September 30 authority for six U. S. companies to export natural gas to foreign countries. This is in accordance with an executive order of July 13, issued by President Roosevelt, and is intended to provide time for the Commission to make recommendations before granting definite authorizations.

The companies affected are Iroquois Gas Corp., of New York, exporting to Canada, and the following Texas companies which export to Mexico: United Gas Pipe Line Co., United Gas Corp., El Paso Natural Gas Co., Texas Cities Gas Co., and Texas Gas Utilities Co.

■ ■

Canadian Meeting Dates Set

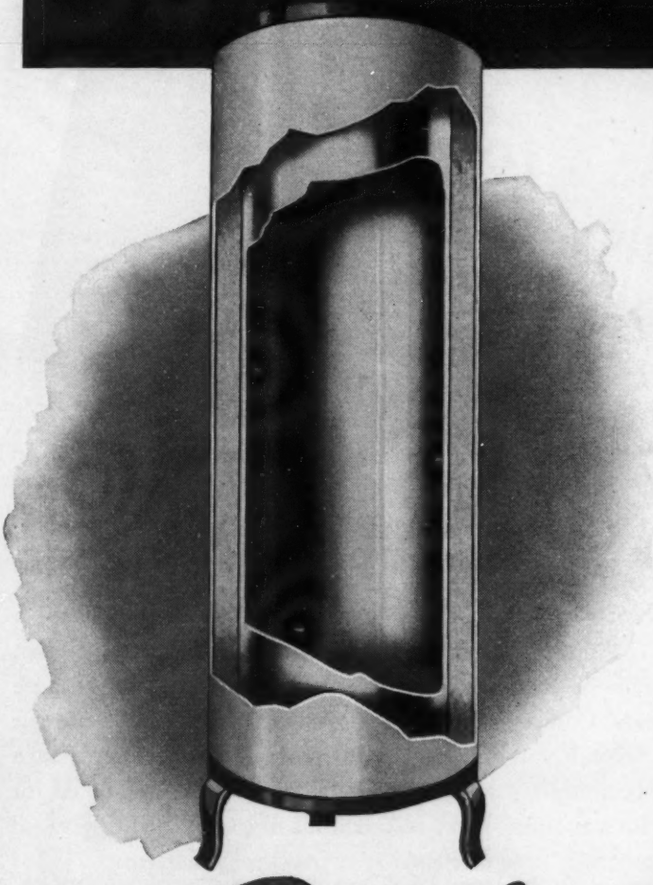
According to a recent announcement by George W. Allen, secretary, next year's 33rd annual convention of the Canadian Gas Association will be held at Jasper Park Lodge, Alberta, Canada, on Wednesday, Thursday and Friday, July 3, 4, and 5, 1940.

Steadier Gas Consumption

Fewer Service Calls

Happier Customers

..."Yours for keeps" when you promote water heaters with tanks of non-rust Everdur Metal



AUTOMATIC GAS WATER HEATERS equipped with tanks of non-rust Everdur* are money savers for the customer...and profit makers for the utility.

They provide the customer with rust-free hot water...long, dependable service ...and complete freedom from all trouble and expense due to rust.

From your standpoint, rust cannot interfere with the efficient operation of an Everdur-equipped water heater. Gas consumption is uninterrupted. Unprofitable service calls are less frequent. Customers are satisfied... good-will maintained.

Everdur is Anaconda's copper-silicon alloy. Nearly all copper, it combines unusual resistance to corrosion with good welding properties and the tensile strength of mild steel. Over 20 leading makers of automatic gas water heaters are using Everdur for tanks in non-rust models. 3949

ANACONDA from mine to consumer

Everdur Metal

Visit the Copper & Brass Industry Exhibit in the Metals Building, New York World's Fair — 1939.

© N. Y. W. F.

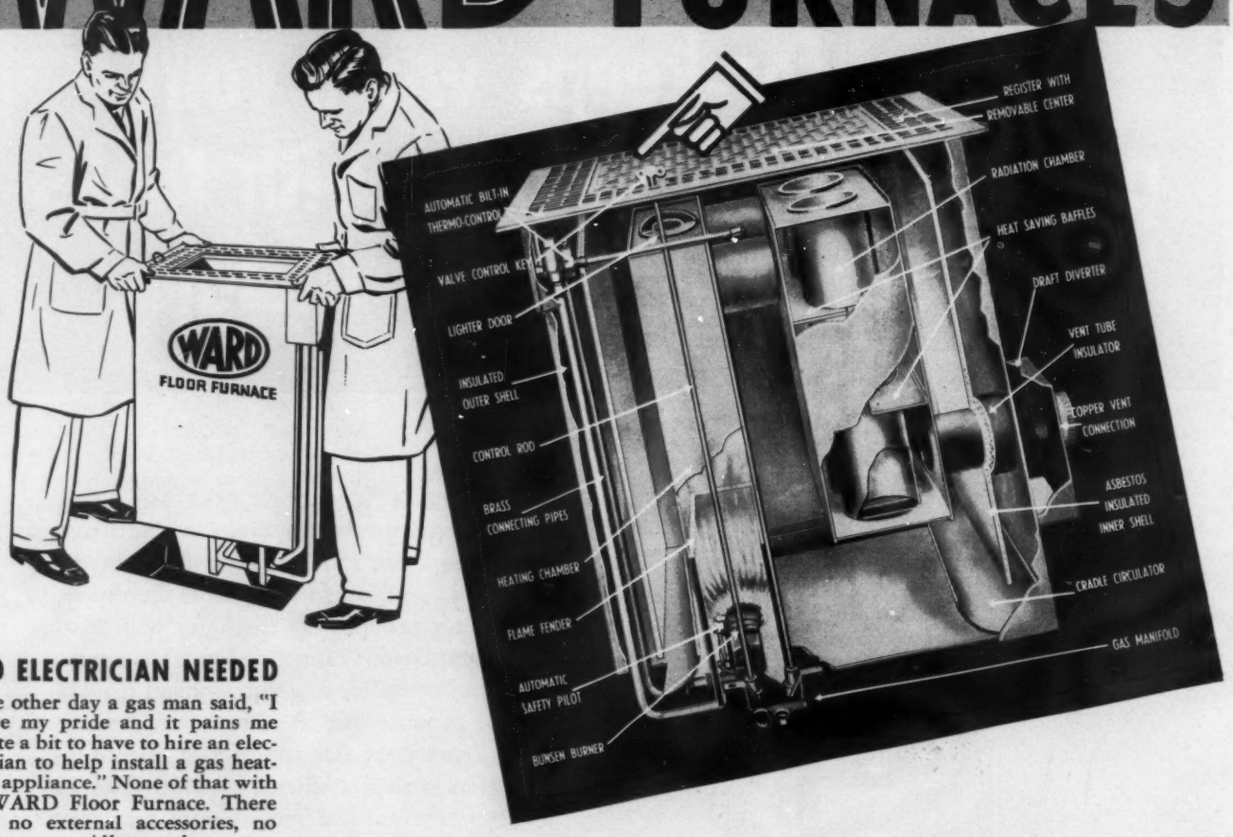
THE AMERICAN BRASS COMPANY, General Offices: WATERBURY, CONN.

In Canada: Anaconda American Brass Ltd., New Toronto, Ont. • Subsidiary of Anaconda Copper Mining Co.

*EVERDUR is a trade-mark of The American Brass Company, registered in the United States Patent Office.

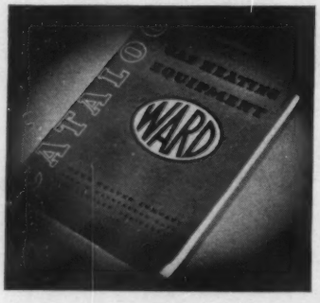
PARDON US FOR POINTING, BUT . . .

WARD GAS FLOOR FURNACES



NO ELECTRICIAN NEEDED

The other day a gas man said, "I have my pride and it pains me quite a bit to have to hire an electrician to help install a gas heating appliance." None of that with a WARD Floor Furnace. There are no external accessories, no wires to run. All controls . . . everything . . . is built in. The furnace is completely self-contained. Just drop it in the floor opening, attach to vent and gas and light the automatic pilot.



YOU WIN TWO WAYS WITH A WARD

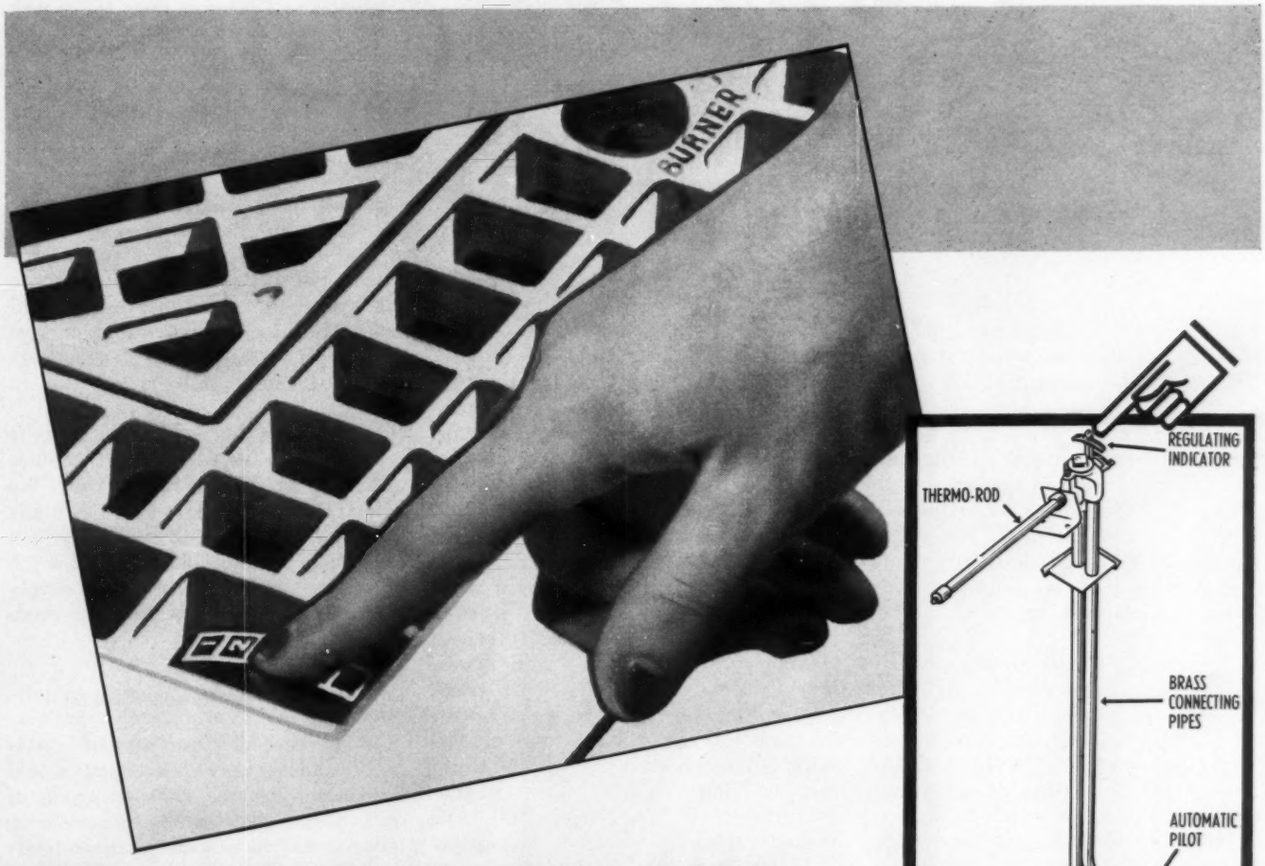
One profitable point we would like to make is that when you install a WARD *Automatic* Floor Furnace . . . you win in more ways than one. First, you win your consumers' good will for gas as a fuel in space heating because WARD'S Automatic Controls regulate warmth so *accurately* and use gas so *economically*. Second, you clinch your customer "for keeps" because a WARD Furnace becomes a *permanent* part of the house. Guaranteed for ten years . . . built for a lifetime. Once installed it's in to stay. So with Ward you win in *"the long run,"* too. *Our catalog is yours for the asking.*

WARD HEATER COMPANY • LOS ANGELES

☆ *WRITE TODAY FOR OUR LATEST CATALOG AND PRICE LIST*

YOUR LOAD IS AS GOOD AS THE APPLIANCE YOU SELL

THIS POINT PUTS PROFIT IN HEATING



WARD'S *BILT-IN* THERMO-CONTROL

It's Automatic! It's Accurate!

This advertisement points to a particularly important Ward Floor Furnace feature... a prime factor in fine performance. Ward's *Bilt-in Thermo-Control* has helped build the furnace's popularity wherever gas... natural or bottled... is used. It is an amazingly sensitive thermostat that is *part of the furnace*... not away on a wall.

The drawing shows the complete Thermo-Control Assembly. It points out the regulating indicator located in a corner of the floor register. Just below floor level (which experiments have proved is a far more effective point of control in a circulating system than any higher spot) is the Thermo-Rod which operates an expanding, swift-acting, brass valve. It contacts practically all the room air as it is drawn through the furnace 3 to 6 times an hour. That means greater warmth-regulating accuracy.

At our factory, every precaution is taken to afford, as nearly as possible, a mechanically perfect heating control. For results, ask any Ward owner what he thinks about the *comfort control* of the *"furnace that practically thinks for itself."*

FACTORY REPRESENTATIVES

A. S. KINCAID, 2012 North Harwood, Dallas, Texas · J. H. STUBBINS, 300 East 68th Terrace, Kansas City, Missouri · H. C. SANDERSON, 207 Fulton Bldg., Pittsburgh, Pennsylvania · W. D. ROBERTS, 468 Peoples Gas Bldg., Chicago, Illinois · LEON M. TAYLOR, 3200 Main Street, Dallas, Texas.

SELL THE BEST...SELL THE WARD FLOOR FURNACE

SALES Slants

• **THIS SERIES of articles dealing with sales fundamentals, which began in the Sales Slants department of the June, 1939, issue with a chapter entitled, "Getting Yourself in the Proper Frame of Mind," is continued this month with Chapter 3, an analysis of why people buy. These articles are not intended as a course of study nor do they aim to teach a new system of selling, but rather it is their purpose to present in a direct and unacademic manner a few of the fundamental principles on which the art of selling is based.—EDITOR.**

The Motive Which Impels People To Buy Things

WE come now to a consideration of the motives which impel people to buy things. Most writers have a tendency to over-simplify this problem. In an attempt to arrive at a formula covering all cases, they try to find a few general motives behind all transactions. One well known authority on merchandising and salesmanship, as an instance, boils the whole thing down into a single motive: gain —which, he says, governs not only the buying impulse, but every other human action.

Now no one would dispute the fact that gain is at the root of all enterprises. What normal and rational person would commit an act, even the act of self-destruction, that he did not think would benefit him in some way, either directly or indirectly? No profound analysis of human conduct is necessary to arrive at that conclusion. But having arrived at it, so what? How is the mere knowledge that human beings are activated solely by gain going to help the salesman sell?

A Concrete Example

Let's take an example. Let's suppose two men enter a store together and each purchases a bottle of milk. Customer One's reason for wanting milk happens to be that he is underweight, and he believes a milk diet will help him put on pounds. Customer Two, on the other hand, being well fleshed, wants milk simply because he likes it and finds it a refreshing beverage. Now both men, obviously, hope to profit in some way by the purchase of the milk. Customer One expects to secure health, and Customer Two anticipates satisfaction of his appetite. Insofar as the basic impulse is concerned their motives are identical. This fact in itself might be of interest and possibly of value to a psychologist. But would it mean anything to a salesman? Having determined that both customers are governed by a gain motive, can the salesman utilize the knowledge to any advantage?

Let's dig a little deeper. Suppose you are a salesman in the store to which Customer One and Customer Two have come for milk. Suppose you have two grades of milk: Grade A, selling for 15 cents a quart, and Grade B, retailing for a dime. Now Customer One is a careful man. One quart of milk is just like another to him, and he can't see any immediate reason why he should pay out his good 15 cents for something he can get for 10 cents. Having studied the books and determined that he is controlled by a gain-motive, you know he is trying to profit in some way by the purchase of the milk. But where do you go from there? What you have to do if you really want to do a good sales job is to find out why the man is buying the milk, don't you?

"Now, Mr. One," you have to say, "would you mind telling me what you are going to use that milk for? Are you going to feed the cat, are you going to drink it yourself, or do you want it for your children?"

Let us suppose you are a good enough salesman to ask that question without having the customer take offense, and he replies that he is trying to gain weight. Now you have a specific reason. And you can guide your sales talk accordingly. In this case you would probably point out that the 15 cent grade has a higher butter fat content and consequently is much richer in fat producing elements than the cheaper grade. In other words, you have analyzed his need, and it is your job to recommend the particular quality of merchandise that fulfils his requirements, and convince him that that is what he should buy.

And the same rule applies in handling Customer Two. Suppose, unlike Customer One, he is used to buying the best, and he cannot make up his mind which grade of milk he wants. Again the knowledge that he is controlled by a gain impulse will be of little value in helping him decide. It is necessary to find out his particular reason for buying. In this case, an appeal on the basis of food value obviously would have little force. What would interest him, in all probability, is the fact that the higher grade milk is superior in taste.

However, in this connection, there is a point we made in our first chapter which we would like to reiterate. We said: "The modern salesman has many functions. The least of these is to sell something to some one. It is his job to analyze human needs, and to supply the thing that will satisfy those needs adequately."

Analyze Needs First

In the case of Customer Two, it is not unlikely that a salesman would determine that the cheaper grade of milk would answer the customer's requirements even more satisfactorily than the more expensive one. He might reason that the two grades are identical from a taste standpoint, and since the cheaper grade contained less fat producing elements, it would be less likely to give this man weight he didn't need. If the salesman, analyzing his customer's requirements, arrived at such a conclusion, then it would be his duty to sell his customer the cheaper grade.

We have chosen the simplest sort of transaction. But the same elements will be found whether you are selling milk for a dime a quart or gas refrigerators by the carload. You cannot do an adequate selling job unless you know your customer's individual reason for buying. That this rule can be applied specifically to the business of selling gas appliances is seen in the following excerpt from a talk made by a saleswoman who has had remarkable success in the field of gas appliance merchandising:

"I discovered a formula quite early in my sales career: Show the customer the merchandise. Allow her to look over the various types, sizes, and makes of appliances on the floor. This gives

Put in your thumb and pull out a plum

HAS IT ever occurred to you that the replacement market is a juicy pie that holds a rich plum for you in your section?

Just listen to this:

It is estimated that more than a million people in this country will replace their worn, outmoded automatic refrigerators this year alone.

In direct profits alone, winning these potential Servel sales is well worth the effort.

An opportunity—NOW

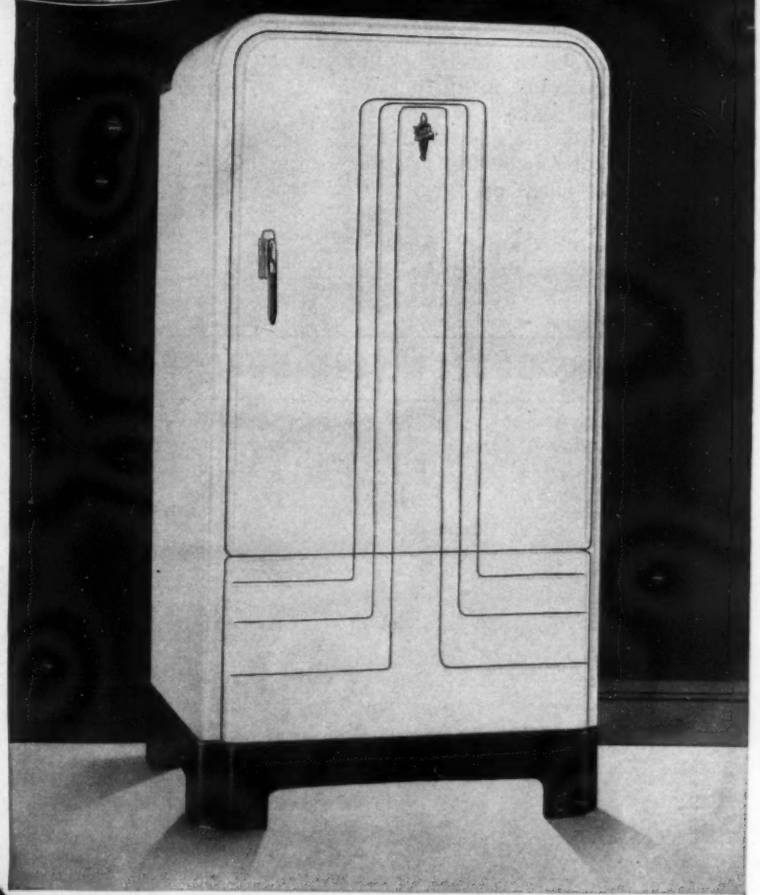
But, in addition, don't overlook the fact that selling these people on *gas* refrigeration will also build your present gas load . . . with no extra investment required on your part.

Not only that, but adding refrigeration to their use of gas will interest the people you sell in the modernity of gas . . . make them want other gas appliances.

Above all, selling them *now* will keep them your customers . . . whereas if you miss this opportunity, another may not come your way again for years.

If you want this plum . . . just stick your thumb in the waiting replacement market.

Servel, Inc., Servel Electrolux Sales Division
Evansville, Indiana



The SERVEL ELECTROLUX Gas Refrigerator

Gas Refrigeration:

- **Publicizes the Modernity of Gas**
- **Protects Your Present Gas Load**
- **Stimulates the Sale of Other Gas Appliances**
- **Builds Gas Load without Extra Investment**
- **Promotes "Gas for All Four Jobs"**

WINS GOOD WILL FOR GAS SERVICE

the salesperson an opportunity to get a case history of the prospect.

"Women are only too glad to talk about their families and homes, and it is no trick at all to find out how many people are in the family, their cooking preferences (assuming that she is looking at a gas range), the sort of home in which they live, and any other similar information that will be helpful in determining the needs and preferences of the customer.

"From the information obtained during this stage of the contact, the salesperson should be able to select exactly the type, style and size appliance the customer should have to fit her individual requirements. In fact, the salesperson, being a specialist in the field of household appliances, knows better than the customer herself what she wants; and it is up to the salesperson to sell that appliance to the prospect—to tell her about it so convincingly that no doubt will remain in her mind that that is the range she wants."

In our next number we will further discuss the buyer's mental processes.

Again Hollywood Glorifies Modern Gas Appliances

HOLLYWOOD has gone "all the way" in featuring the latest models of gas ranges and gas refrigerators exclusively in the M-G-M production of "The Women," starring Norma Shearer, Joan Crawford, Rosalind Russell and Paulette Goddard in an all-women cast. First showings will be on or about September 1.

The A.G.A. has suggested that gas companies plan a complete promotional tie-in. Suggestions for the tie-in follow:

1. All promotion should be made in advance of the actual showing of the picture, so that the public may know that the ultra-modern kitchens in "The Women" are completely gas equipped.

2. The theatre manager's *Exploitation Book* on "The Women" contains many promotional ideas.

3. By converting regularly scheduled newspaper advertising space to special tie-in copy featuring the two all-gas kitchens in "The Women," present budgets need not be disturbed.

4. The A.G.A.'s first sales promotion tie-in portfolio for the 1939-40 National Advertising Program has been issued. Included in this portfolio are three pictures from "The Women," ready for immediate delivery. The theatre manager will have additional pictures.

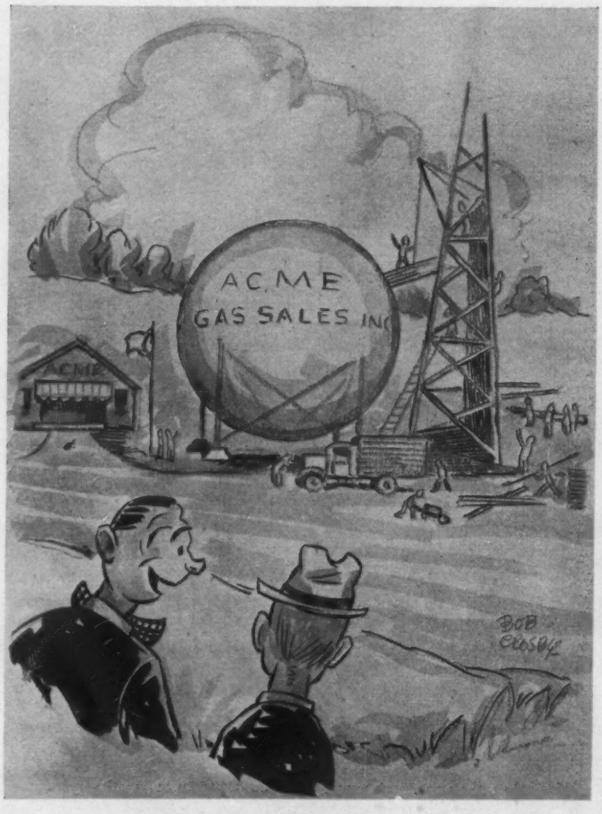
5. Dealers handling gas ranges and Electrolux refrigerators can tie-in profitably with the picture by using window displays and sponsoring special newspaper advertising.

6. Another tie-in is a display of gas appliances in the theatre lobby and mezzanine.

7. Show cards and streamers for window and sales floor use are effective. So are photographs of scenes from "The Women" and members of the cast.

■ ■

DOTTED LINE ROSCOE



"Since the sales chief got back from New York he sold the Company on building a trylon next to each holder."

Gas Energy Sold in 1938 Triples Electric Sales

The energy sold and distributed by the gas industry in the United States during 1938 amounted to approximately 1380 trillion B.t.u., more than three times the total electric sales of 420 trillion B.t.u. during the same period, according to compilations by the American Gas Association. These figures are arrived at by converting the M c.f. and kw. hr. figures into B.t.u.

Industrial requirements accounted for over 50 per cent of total gas distribution in 1938. This was used primarily for boiler fuel, cement and lime kilns and oil refineries, all non-competitive with electricity.

Evidence of the importance of the gas industry, as compared to that of electricity, is suggested in the A.G.A. findings in the fact that one of the larger natural gas systems in the U. S. markets nine times the annual energy that will form the ultimate capacity of the TVA hydro-electric power development of 1,400,000 kw., or 26 trillion B.t.u. annually. The present TVA capacity is but 420,000 kw.

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United Gas Corp. Conducts "Better Living" Campaign

A "better living" sales program, which features cooking schools and follow-up calls, is being conducted by the United Gas Corp., Houston, Texas, to expand gas service in the smaller towns in its territory.

A cooking school, sponsored by some local women's organization and conducted by one of the United Gas Corp.'s home service directors, is held in the towns. Local merchants furnish prizes to be given away daily. Recipes and news stories pointing out the advantages of modern gas appliances are published in the local newspapers before the classes are held. Immediately after the school, residential salesmen, a home service adviser and a service man, call on every home in the community.

■ ■

New Division Office Opened

Headquarters for the East Texas Division of United Gas Corp. have been established at Beaumont, Texas. Offices will be in the American National Bank building. W. B. Currey is superintendent of the division.

CHOOSE YOUR "LOAD-BUILDER"

from this QUALITY GROUP of Distinctive

HUMPHREY RADIANTFIRES

This Fall's load building campaign should hold unusual opportunities for aggressive merchandisers.

More and more people are becoming interested in home comfort improvements. Thousands who are seeing the Radiantfire exhibit at the New York World's Fair are enthusiasitc about the modern styling, pleasing appearance, and operating efficiency of the new models.

Send today for the new Humphrey Radiantfire portfolio with proven campaign plans and "workable" sales aids.

GENERAL GAS LIGHT COMPANY

KALAMAZOO, MICHIGAN

23 Warren St., NEW YORK CITY 2nd Unit Santa Fe Bldg., DALLAS 475 Eleventh St., SAN FRANCISCO

THE WOMAN'S Viewpoint

Home Service Women Meet In Los Angeles this Month

A PROGRAM slanting on the sales side of home service work has been planned for the A.G.A. Home Service Conference and Training Course to be held at the Chapman Park Hotel, August 22 through 26. According to Gladys Price, Southern California Gas Co., and chairman, Home Service Committee, actual demonstrations will be presented to show just how home service is geared to give authoritative information to customers—the type of information best illustrating the importance of gas and the efficiency of gas appliances. Group conferences and discussions are planned in which views on home service operation and administration will be exchanged.

This year's program includes a new feature—personally conducted trips to the various home service kitchens throughout the Los Angeles area, and to manufacturing companies. A beach party at the Del Mar Club, Santa Monica, Thursday afternoon, August 24, has been planned as part of the entertainment, in addition to luncheons and dinners.

The detailed program is as follows:

Tuesday Morning—August 22
Chapman Park Hotel

Registration.
Introduction of Course—Gladys B. Price, Chairman A.G.A. Home Service Committee.
"What the Utility Expects of Home Service"—Norman R. McKee, vice president, Southern Counties Gas Co.
"New Trends in Home Service"—F. M. Banks, vice president, Southern California Gas Co.
"Home Service Operation"—Gladys B. Price, Southern California Gas Co.

Tuesday Afternoon—August 22
Chapman Park Hotel

"Home Management Training Prepares for H. S."—Eleanor Spike, Oregon State College.
"Home Service Today"—Jessie McQueen, Home Service Counsellor, A.G.A.
"Home Service Training in College"—Elizabeth Sweeney, Syracuse (N. Y.) University.
"Home Calls"—Explanation and Skit—Colleen Fowler, Kansas City Gas Co.
Get Acquainted Dinner will be offered with the compliments of Association of Gas Appliance and Equipment Manufacturers.

Wednesday Morning—August 23
Chapman Park Hotel

Registration.
"Gas Does the Four Big Jobs"—A. F. Rice, chairman, Domestic Sales Committee, Pacific Coast Gas Association.
"Practical Use of the C. P. Gas Range"—Grace Meyer, Southern California Gas Co.
"Principles of Demonstration"—Speaker to be announced.

Wednesday Afternoon—August 23
Hollywood Auditorium
Southern California Gas Co.
Cleo Kerley, Hostess

"Drama in Demonstration" (Actual Demonstration)—Margaret Martin and Florence Windecker, Southern California Gas Co.
"What the Customer Wants to Know"—Jane Tiffany Wagner, Servel, Inc.
"Gas Refrigerator Demonstration"—Marguerite Scroggie, Southern Counties Gas Co.
Refrigerator Symposium—C. A. Miller, Servel, Inc.

Thursday Morning—August 24
Chapman Park Hotel

Registration.
Group Conferences—Catherine Calahan, Public Service Electric & Gas Co.; Ruth Sheldon, Washington (D.C.) Gas Light Co.; Mary A. Crosson, West Texas Gas Co.
"Dealer Cooperation"—Cleo Felsinger, Pacific Gas & Electric Co.
"Fundamentals of Gas Water Heater Service"—R. V. Davis, Southern California Gas Co.
Reports of three group conferences.
"Club Women's Luncheons"—Vira Bardwell, Southern California Gas Co.

Thursday Afternoon—August 24

Luncheon—Payne Furnace Auditorium, Beverly Hills.
Luncheon Demonstration—Lucile Martens, Southern Counties Gas Co.
Trip through Payne Furnace Company.
Visit to Home Service Auditorium (Dessert Buffet)—Southern Counties Gas Co., Santa Monica. Hostess, Katherine Rathbone, Home Service chairman, Pacific Coast Gas Association.
Beach Party—Del Mar Club, Santa Monica.

Friday Morning—August 25
Chapman Park Hotel

Registration.
"Do You Know"—F. O. Suffron, A.G.A. Testing Laboratory.
"Home Service Abroad"—Pauline Edwards, Honolulu Gas Co.
"Fitting Into the Sales Department"—F. M. Rosenkranz, The Gas Service Co.
"Putting Conference Ideas Into Practice"—Gladys B. Price, Chairman of the Conference, Southern California Gas Co.

Friday Afternoon—August 25

Personally conducted tours—(1) Range Factories; (2) Home Service Kitchens.

The course is sponsored each year by the Home Service Committee of the Commercial Section of the American Gas Association.

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Miss McQueen Addresses Home Service Meeting

Jessie McQueen, home service director of the A.G.A., was a featured speaker at the two-day convention of home service employes of the Gas Service Co., the Kansas City Gas Co., Kansas City, Mo., and the Wyandotte County Gas Co., Kansas City, Kan., held at the Muehlebach Hotel in Kansas City, Mo., July 5 and 6. Miss McQueen gave a number of recipes and stunts for making home service demonstrations more entertaining.

Discussions, a number of talks by company executives, and demonstrations in the new home service kitchen at Merriam, Kan., comprised the program. Betty Boyle, home service director of the Gas Service Co., was in charge of the meeting.

■ ■

Home Service Head Named

Jeanette Campbell, formerly in the home service department of the East Ohio Gas Co., Cleveland, has been appointed home service director of the Minneapolis Gas Light Co., Minneapolis, Minn. Miss Campbell replaces Helen Diamond, who recently resigned.

CLEO FELSINGER
Pacific Gas and Electric Company

LUCILE MARTENS
Southern Counties Gas Company

RUTH SHELDON
Washington Gas Light Company

COLLEEN FOWLER
Kansas City Gas Company

THE STYLE . . . Leader FOR 1939 . . .

Gas THE MODERN FUEL

WEDGEWOOD

THE ARISTOCRAT OF GAS CIRCULATING HEATERS

Again for 1939—the beautiful Wedgewood Console Circulating Heater sets the style for gas heating on the Pacific Coast! In appearance it is a symphony in modern streamline design. It's the finest gas heater in Wedgewood history. Because it adds lasting beauty to a home and heats at low cost it is the favorite among buyers everywhere.

Inside it is just as fine! Its scientifically planned combustion delivers maximum heat from gas used. Outer cabinet and bottom are air-blanket insulated. Large one-piece ribbed steel heating unit has non-corrosive high-heat finish. Special down-draft diverter. Automatic lighter. Can be thermostatically equipped. Low flue fits any fireplace. Is A. G. A. approved vented and unvented.

Three Beautiful New Finishes

Wedgewood offers a wider choice of beautiful finishes and color tones. In Morocco finish there is Sandtone with Chromium Trim and Seal Brown with Chromium Trim. New for 1939 is the Hammertone finish which gives the appearance of delicately hammered metal.

Three Practical Sizes

To fit the heating budgets in small or large homes, Wedgewood offers three extremely practical sizes. Several rooms can be kept comfortably warm with any one of these sizes.

ALWAYS WEDGEWOOD QUALITY—OVER A MILLION SATISFIED USERS

JAMES GRAHAM MANUFACTURING CO. • LOS ANGELES • SAN FRANCISCO • NEWARK, CALIF. • PORTLAND, ORE.

"Believe It or Not"...

the porcelain enameled object at the left is a stove! It is a Swiss creation and is considerably older than the Declaration of Independence. And yet the porcelain enamel finish has all the lustre and durability of yester-century.

● We should be glad we don't have to sell stoves like this antique—*today*. They'd probably command a thousand dollars apiece, even under our modern "production basis." But if we did—well, we'd be selling the "lifetime" finish. It would be porcelain enamel, and here's proof that porcelain enamel lasts many generations.

Mrs. John Q. Public *knows* the durability of porcelain enamel. She has it on her bathtub, sink, washing machine, refrigerator, ironer, dish pan—whatnot! So all you have to do is say: "this range" (or "this heater") is all-porcelain and your sale is very favorably affected. And it will be a better sale from the standpoint of customer satisfaction and repeat sales if it bears the "LUSTERLITE" label. Because the name LUSTERLITE is the hallmark of quality in porcelain enamel. Your appliance manufacturer will back us up on that statement. It is your *guarantee* of porcelain enamel quality.

Remember: the more LUSTERLITE porcelain enamel on the appliances you sell the more profit for you through customer satisfaction. Tell your supplier that you want the ranges and heaters you sell to carry the LUSTERLITE label. It is an added selling point for you—(a powerful one).

CHICAGO VITREOUS ENAMEL PRODUCT CO.
1405 SOUTH 55th COURT · CICERO, ILLINOIS

LUSTERLITE *Porcelain* ENAMELS

INDUSTRY *Personalities*

Ernest R. Acker, president of the Central Hudson Gas and Electric Corp., of Poughkeepsie, N. Y., was recently honored by employes on the twentieth anniversary of his service with the Central Hudson System.

Edward W. Leverett, gas distribution foreman at Kingston, presented Mr. Acker with a book containing a congratulatory letter and employes' signatures.

Gustav A. Trester, Milwaukee (Wis.) Gas Light Co. advertising manager, was recently elected treasurer of the Milwaukee Advertising Club.

W. B. Steffey, formerly superintendent of the Arkansas-Louisiana Gas Co., Pine Bluff, Ark., has been named manager of the company's properties at Hope, Ark. **J. K. Sales** will succeed Mr. Steffey at Pine Bluff.

E. C. Steele, Union Gas Co. of Canada, Ltd., Chatham, Ontario, has been elected chairman of the silver jubilee safety convention committee by the Industrial Accident Prevention Association.

George J. Pacanovsky, engineer in the research department of the A.G.A. Testing Laboratories, Cleveland, Ohio, has been awarded the Leadership Medal by the Junior Division of the Cleveland Engineering Society. Mr. Pacanovsky has been associated with the Laboratories for nearly a year.

Bernard H. Wittman has been appointed domestic sales manager of the Peoples Gas Light and Coke Co., Chicago. He has been with the company since 1920.

Paul R. Johnson, president of the Union Gas System, Inc., has announced the removal of his company's offices into newly-remodeled quarters in Independence, Kan.

C. W. Manning assumed his new duties of outside foreman for the Community Natural Gas Co. in Sweetwater, Texas, on July 1. He has been in the employ of the same company at Brownwood, Texas, for the past three years.

John O. Jenkins, who has been chief clerk of the Gas Service Co. at Newton, Kan., for seven years, has been transferred to the new business department, and has been replaced by Max Jones, formerly cashier of the El Dorado office.

George B. Finney, for more than 22 years superintendent of the Selma (Calif.) gas and water department of the Pacific Gas and Electric Co., retired on July 1.

Roy Coffee, general attorney for Lone Star Gas Co., Dallas, Texas, has been elected to the presidency of the Dallas Lions' Club. He was formerly first vice president and a member of the board of directors.

W. S. McMichael has been awarded a 10-year service emblem by the Arkansas Western Gas Co. for his first decade as manager of Siloam Springs, Ark., office of the company. Mr. McMichael joined the company at time the Siloam office was opened in 1929.

P. W. Swope has recently been appointed chief engineer of Ranger (Texas) compressor plant of the Lone Star Gas Co., according to an announcement by B. L. Rogers, superintendent of the compressor department.

J. E. Mineo was given the honor award among 65 employes of the Oklahoma Natural Gas Co. on July 7 for 27 years of safe driving while in the employ of the company. Mr. Mineo, 64 years of age, and Tulsa (Okla.) distribution superintendent, has driven company cars a total distance of 500,000 miles without a chargeable accident, and during the same period has driven his private cars an additional 250,000 miles without mishap.

Harry H. Harding, for the last 20 years superintendent of Interstate Power and Light Co. plant at Hudson, Wis., retired on August 1. He was succeeded by **W. A. Sherburn**, who has been in the Stillwater, Minn., office of the Northern States Power Co. for the past four years. Mr. Harding stated that after a brief rest he would begin catching up on his fishing, which has been neglected for years.

Charles Wagner has been appointed to represent the Pittsburg Water Heater Corp. in the states of Missouri, Kansas, Arkansas, Louisiana and Oklahoma. He will continue to represent the Detroit-Michigan Stove Co. in Missouri and Kansas, with his headquarters in Kansas City.

Otto H. Bundy, for 10 years in the service of the Montana-Dakota Utilities Co. at Sidney and Glendive, Mont., has been promoted to the management of the Glasgow, Mont., office. He succeeds **James Phillips**.

Charles W. Smythe, for 27 years in the employ of the Public Service Corp. of New Jersey, has been named general superintendent of gas manufacture for the Public Service Electric and Gas Co., Newark, N. J., to succeed the late James G. O'Keefe.

A. P. Rowland, formerly district manager of Community Natural Gas Co. at Brownwood, Texas, has been appointed division superintendent for the Texas Cities Gas Co. with headquarters in Waco, Texas, according to an announcement by L. B. Denning, Jr., vice president and operating manager of the Texas Cities company. Both companies are a part of the Lone Star Gas System.

Joe C. Darrow, who has been district manager for Community Natural at Terrell, will succeed Mr. Rowland at Brownwood, it was announced by M. L. Bird, division superintendent.

W. O. Anderson, formerly district manager at Denton, will replace Mr. Darrow at Terrell.

Other major changes in the managerial personnel of Community Natural were announced recently by Mr. Bird:

George P. Williams, formerly at Sweetwater, will succeed **Jacob B. Price** as manager at Wichita Falls. Mr. Price will go to Denton. **J. D. Holbrook**, office manager at Wichita Falls, will go to Sweetwater, and **J. W. League** of Galveston will become office manager at Wichita Falls.

Richard Bernard, for several years a salesman in the Auburn, Neb., office of the Peoples Natural Gas Co., has been transferred to Grand Junction, Iowa, where he will continue his sales work. **G. R. Daley**, formerly in the Omaha office of the company, will replace Mr. Bernard at Auburn.

W. H. Steffey, for 10 years manager of the Arkansas-Louisiana Gas Co. at Pittsburg, Texas, has been transferred to Atlanta, Texas, where he will be local manager of the company, it was announced recently by W. J. MacIntyre, manager of the Southern division.

Don P. Warner, formerly field crew supervisor for the Kansas City (Mo.) Gas Co., has been named district manager of the Gas Service Co. at Warrensburg, Mo., to succeed the late J. J. Schubert, it was announced recently by B. C. Adams, vice president and general manager. Mr. Warner was new business manager for the Gas Service Co. at Warrensburg from 1931 to 1935.

Effective August 1 the Carrollton, Mo., office will be operated in conjunction with the Warrensburg office. **Leslie M. King**, manager at Carrollton for several years, has been transferred to Topeka, Kan., where he will do sales work for the company.

E. M. Farley, of the Kansas City Gas Co. sales department, has been appointed a sales crew supervisor, taking the place of **M. E. Evans**, who replaces Mr. Warner. Changes became effective July 1, according to H. C. Porter, new business manager of the Kansas City Gas Co.

DOTTED LINE ROSCOE

For accepted and published captions to the "Dotted Line Roscoe" Cartoon, published below, G A S will pay $5.00. Address G A S, 810 South Spring St., Los Angeles, Calif.

"Tell 'em if they won't sign up you'll support Roosevelt for a third term."

Walter G. Groth, for five years associated with the gas appliance division of the Bosch Corp., Springfield, Mass., and 10 years with the Middle West Utilities Co., has been appointed vice president in charge of sales for the Burkay Co., Toledo, Ohio, according to an announcement by the company's president, Jefferson D. Robinson, Jr.

A. B. Paterson, president, New Orleans Public Service Company, Inc., has announced the appointment of **Harold Meade** as assistant to the president. Mr. Meade was formerly general sales manager, and is succeeded in this post by **W. J. Amoss.** In turn **Streuby L. Drumm** has been made industrial and commercial sales manager, filling the position formerly occupied by Amoss. **J. R. Guidroz** has been made residential sales manager, the position occupied by Mr. Drumm. He was formerly supervisor in this department.

O. L. Story, walking pipe line for the last 22 years for the Lone Star Gas Co., has covered more than 88,000 miles on foot, equivalent to more than three and a half times around the world. He is looking expectantly to the 100,000-mile mark which he expects to reach in the regular course of his duties within the next several years. Working out of the Irving station of the Dallas (Texas) pipe line district, Mr. Story now travels 11 miles a day, and employs no aids other than a stout stick for protection against vicious dogs and snakes and to steady him in crossing rivers on the 20-inch mains.

J. A. Cornelius has been named manager of the Pond Creek, Okla., office of the Oklahoma Natural Gas Co., replacing C. M. Gates, who retired July 1 and who has been representing the company in various capacities in Pond Creek for 22 years. Mr. Cornelius was formerly stationed at Marshall, Okla., and his new duties will extend to the plants located at Deer Creek, Lamont, Garber and Hunter.

H. Leigh Whitelaw, formerly vice president of American Gas Products Corp., New York City, has become associated with the Jones and Laughlin Steel Corp., Pittsburgh.

Frank Sigafoos, Citiziens Gas and Coke Utility, Indianapolis, Ind., has been named manager of the Coke Service department.

So Beautiful...
YOU WON'T BELIEVE
IT'S A HEATER!
WARM AIR CIRCULATOR
NEW!
Write Today for
SPACE HEATER CATALOG
And Details of New Fall Merchandising Program.
★ Pacific sales are all profit — no costly after service — every customer a booster!
WRITE NOW
Pin to your letterhead . . Mail today.
Pacific Gas Radiator Co. Dept. G 8
1740 W. Washington Blvd., Los Angeles
Send complete literature and prices on—
Name
Address
26 Successful Years
. . . and still growing!
Pacific THERMOLATOR

C. D. Marshall, chairman of the Executive Committee of the Board of Trustees of Koppers United Co., resigned July 25. The Executive Committee has elected **J. T. Tierney** to this position. Mr. Tierney also continues as president, and Mr. Marshall retains his membership on the Board. Mr. Tierney will also be Chairman of the Board of Koppers Co., resigning his position as president of this principal operating unit of the Koppers organization.

Mr. Tierney will be succeeded as president of Koppers Co. by **J. P. Williams, Jr.,** vice president of Koppers United Co. and president of The Koppers Coal Co.

G. E. CLIFFORD

George E. Clifford has been appointed vice president, in charge of sales, for Spang Chalfant, Inc., effective August 1, according to an announcement by A. E. Walker, president of the company. Mr. Clifford will have his headquarters in Pittsburgh, Pa. For nine years he has been with the Republic Steel Corp., and during the past three years he has acted as district sales manager for the Republic at Los Angeles.

Mr. Clifford is a member of the Pacific Coast Gas Association and is well known to the gas fraternity.

M. H. Montross, Wausau, Wis., has been elected to the board of directors of the Wisconsin Public Service Corp., according to J. P. Pulliam, president. Mr. Montross has been manager of the Wisconsin Valley division at Wausau since 1933 and previously served as district manager at Stevens Point.

Fred Denig, vice president of Koppers Co., engineering and construction division, Pittsburgh, Pa., has been appointed to the newly created post of director of research and development for the Koppers Co., and Eastern Gas and Fuel Associates, allied organizations.

Henry M. Bulger, of the metropolitan branch of the Brooklyn Union Gas Co., won first place in May and June among the 10 leading district salesmen earning the largest commission checks. This duplicated his last year's performance.

The Brooklyn Union Gas Co., Brooklyn, N. Y., passed out checks totaling $734.05 in June to 249 employes who had earned the right to share in the reward because of submitting leads that led to appliance sales by the company. One employe out of every 18 shared in this extra compensation.

C. M. Mineo, formerly with United Gas Service Co., Harper, Kan., has been appointed distribution superintendent of Vinita Fuel Co., Vinita, Okla., and field superintendent of Ruth Fuel Co.

A. W. Breeland, Lone Star Gas Co., Dallas, Texas, has been elected a member of the Citizens Traffic Commission of Dallas.

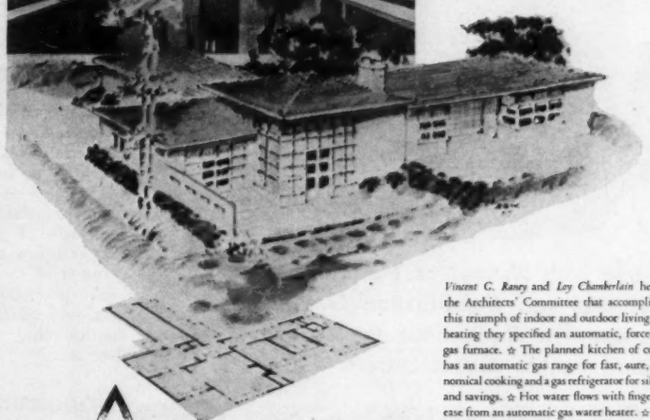
Frank L. Schneider, independent oil operator in Texas, has been appointed Supervisor of Public Utilities in Dallas, succeeding Joseph F. Leopold. Mr. Schneider has been in the utility business for many years.

P.C.G.A. PREVIEW

COOPERATIVE LOAD-BUILDING

Treasure Island's "SUNSHINE HOUSE" all-gas livability

The entire building industry cooperated in fulfilling this architect's dream of the perfect "California Modern" home. It is the all-gas *"Sunshine House"* at the Golden Gate International Exposition, Homeland Division; erected by the Construction Industry Section of the San Francisco Chamber of Commerce. ☆ To millions of visitors it reveals superb planning for comfort, recreation and carefree convenience.



Vincent G. Raney and *Loy Chamberlain* headed the Architects' Committee that accomplished this triumph of indoor and outdoor living. For heating they specified an automatic, forced-air gas furnace. ☆ The planned kitchen of course has an automatic gas range for fast, sure, economical cooking and a gas refrigerator for silence and savings. ☆ Hot water flows with finger-tip ease from an automatic gas water heater. ☆ *Your* architect and builder will approve your choice of gas for these same big jobs in your home.

See the all-gas Sunshine House on Treasure Island. ☆ Then visit the Gas Industry's exhibit, Homes and Gardens Palace.

LET GAS DO THE 4 BIG JOBS

THE MODERN FUEL

HOUSE HEATING · WATER HEATING · COOKING · REFRIGERATION

☆☆☆ **GAS TAKES ANOTHER BOW! SMASH HIT ON TREASURE ISLAND IS THE ALL-GAS "SUNSHINE HOUSE" "STARRED" BY P. C. G. A. IN THIS ARCHITECTURAL AND BUILDING AD.**

P. C. G. A.
H. L. Farrar, President
Clifford Johnstone, Managing Dir.

AUGUST 1939

COMMITTEE
A. C. Joy, P. G. & E.
J. S. Spaulding, So. Calif. Gas Co.

Stanley M. Clark has been elected to the Springfield (Mass.) Gas Light Co. board of directors. He succeeds the late Charles Price, of Boston.

B. G. Davis was elected president of the Independent Gas Producers Association of Ohio on July 1. Taylor M. Bishop and Phillip M. Faine were elected treasurer and secretary, respectively.

D. M. Hill, for the past nine years branch manager in Los Angeles for the Foxboro Co., Foxboro, Mass., has been transferred to the eastern territory. **Virgil E. Schultz**, sales manager on the Pacific Coast for the past eight years, has been appointed Los Angeles branch manager. **H. B. Brooks**, San Francisco branch manager, has been appointed Pacific Coast district sales manager, with headquarters in San Francisco.

William Francis O'Brien, who has been assistant treasurer of Consolidated Edison Co. of New York, N. Y., has been elected treasurer to succeed the late John R. Fenniman.

Thomas J. Best, of the Greenpoint Works, Brooklyn Union Gas Co., was elected commander of the Brooklyn Union Gas Post, American Legion, at the June election. He succeeded Thomas J. Perry, superintendent of customers' service division.

The Federal Power Commission has elected Commissioner **Clyde L. Seavey**, of California, to the chairmanship of the Commission for the remainder of his six-year term, to end June 22, 1940. Commissioner **Claude L. Draper**, Wyoming, was elected to the position of vice chairman, the position Mr. Seavey formerly held in conjunction with the temporary chairmanship that has been his since last October.

William Paulson, Columbus, Texas, manager of the Southern Union Utilities Co., has recently announced his resignation, according to H. C. Frizzell, district manager of the company. **William Hintz** of Belleville has been appointed temporary manager of the Columbus office.

■ ■

Gas Revenues Continue Upward Trend in April

Manufactured and natural gas utility revenues amounted to $72,620,400 in April, 1939, as compared with $68,642,400 for the corresponding month of 1938, an increase of 5.8 per cent, it was announced today by Paul Ryan, chief statistician of the American Gas Association.

The manufactured gas industry reported revenues of $31,586,000 for the month, an increase of 3.5 per cent from the same month of the preceding year. The natural gas utilities reported revenues of $41,034,400, or 7.6 per cent more than for April, 1938.

Total sales of manufactured gas for the month were 32,626,100,000 cu. ft., an increase of 6.9 per cent. Natural gas utility sales for the month amounted to 113,378,500,000 cu. ft., an increase of 8.9 per cent.

■ ■

Canadian Journal Issues 12-Page Gas Supplement

A 12-page supplement devoted to the gas industry was recently issued with a regular weekly edition of *Saturday Night*, newspaper and financial journal published in Toronto, Canada. The supplement was not sponsored by any gas industry organization.

Articles on the history of gas, both natural and manufactured, Canadian gas production, the uses of gas, and modern gas appliances, in addition to many photographs, were included in the supplement. Modern gas appliances for cooking, water heating, house heating, and refrigeration, and modern production equipment, were advertised throughout the section.

■ ■

Construction Work Starts on Mountainair, N. M., Mains

Operating under a recently-granted franchise, J. R. McGill was expected to begin construction in late July of mains to supply gas to Mountainair, N. M. A $2 minimum charge was set up in the rate structure for 2000 cu. ft. of gas. The next 3000 cu. ft. will cost $1, and then graduate down to 60 cents per thousand for the larger consumer.

■ ■

Sale of Securities Planned

The Northern Natural Gas Co., Omaha, Neb., has recently applied to the Federal Securities Commission for permission to sell 22 million dollars' worth of securities. Proceeds from the sales would be used to finance a construction program contemplated by the company and retire its outstanding debt.

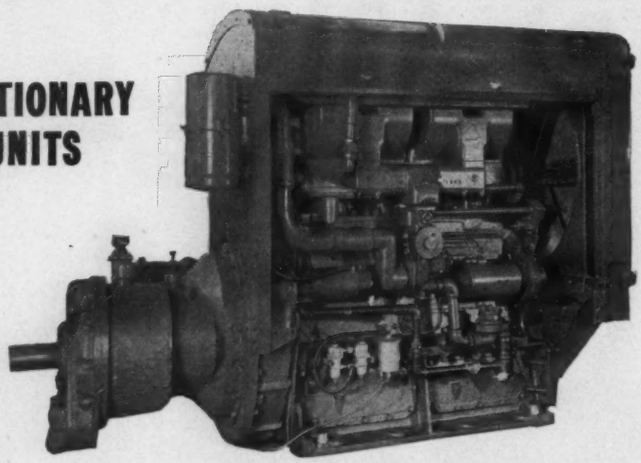
■ ■

Manley, Neb., To Have Gas

The Northern Natural Gas Co., Omaha, has begun construction of a pipe line to the town of Manley, Neb., from its main south of the town. Meters are being installed in 23 homes and business places by the Peoples Gas Co., local distributors.

ENSIGN CARBURETION EQUIPMENT

FOR STATIONARY POWER UNITS

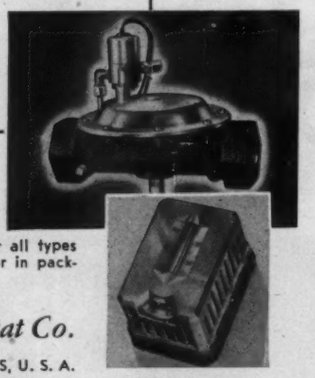


Suitable for use with Natural or Manufactured Gas. ENSIGN Gas and Combination Gas and Gasoline Carburetion Equipment is standard with all leading engine manufacturers.

ENSIGN CARBURETOR CO., LTD.
LOS ANGELES · DALLAS · CHICAGO

USE A SNAP-ACTING COMBINATION

To Control Your Gas Heaters



A Klixon Room Thermostat and Klixon Gas Valve pair up perfectly for accurate gas heater control. Both are operated by a scientifically-calibrated, snap-acting thermostatic disc. And for this reason, the thermostat is super-sensitive, yet vibration-proof and the valve does not hum or stick. Moreover, the valve's automatic time delay prevents fluttering and chattering.
Thermostats are available with several attractive finishes. Valves—for all types of gas—from 3/8 to 1 1/4 I.P.S. through 1000 cu. ft. Sold separately or in packaged sets. Line or low voltage. Write.

KLIXON

Spencer Thermostat Co.
ATTLEBORO, MASSACHUSETTS, U. S. A.

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

GAS APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

FINAL MONTH OF SUMMER GAS HEATING CAMPAIGN

During the past eight weeks, thousands of heating prospects have been influenced by campaign advertising to WANT gas heating. But many have not yet purchased, and if they don't act soon, the 10% discount will be off.

This should be the "go" signal for every gas heating dealer in P. G. & E. territory.

Remember that August will be the best month of the campaign, just as it is every year. And remember why.

Not only does it have the accumulated effect of two months' advertising behind it, but it carries the suggestion of a price rise. And experience has shown that a price inducement about to expire is an even better sales appeal than the news that prices are just reduced.

Start uncorking your biggest guns today. Take advantage of a public made more receptive by our advertising. Stress the quality of your merchandise and your service, and play up the 10% discount for all it's worth!

G 208-839

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Gas Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Gas Appliance Society, 1355 Market Street, San Francisco, California.

HERE IT IS . . .

The PITTSBURG
Gas Fired House Heater

The "Pittsburg House Heater" will fill more universal demands than any other house heater on the market. This house heater is adaptable to any size rating up to 150,000 B.T.U. input.

•

You have only one size to stock, which reduces your inventory, means quicker turnover, less overhead, quicker sales, increased volume, greater profit.

•

The "Pittsburg House Heater" will burn all gases—natural, manufactured, mixed, artificial, liquefied petroleum, etc., efficiently and effectively.

State Kind of Gas When Ordering

Send for Complete Details

PITTSBURG
WATER HEATER CORP.
PITTSBURGH, PA.

SOMETHING TO *THINK ABOUT*

Gas companies report substantial savings on their gas purification costs after adopting the recommendations of Connelly engineers.

These competent men are in daily contact with the gas purification problem throughout the nation and are equipped to render a valuable service to you.

Without cost or obligation, you can and should have "Connelly Service" from these men—even though you think your purification costs are normal. Ask for one of our engineers to visit your plant.

CONNELLY IRON SPONGE & GOVERNOR CO.

CHICAGO, ILLINOIS ELIZABETH, NEW JERSEY

Oklahoma Appliance Dealers Report Sales Advances

A MARKED increase in sales of gas appliances was reported at dealers' sales meetings of Hales-Mullaly, Inc., Oklahoma City, held in Tulsa, June 12, and Oklahoma City, June 13.

About 125 dealers and salesmen of eastern Oklahoma attended the Tulsa meeting and 148, including 112 dealers, attended the Oklahoma City sales banquet and conference, covering Western Oklahoma.

The Hales-Mullaly company conducted a World's Fair sales contest which ran through the months of May, June and July. Dealers and salesmen who qualified and made their quotas will be given a free trip to the New York World's Fair, starting about August 19. Harry C. Canup, sales manager, Hales-Mullaly, Inc., expects at least 100 dealers and salesmen to be on the World's Fair trip.

This firm, exclusive state distributor to dealers in Oklahoma of Electrolux refrigerators and several other gas merchandising lines, reported that it has experienced a much greater volume of business since converting its business, on the first of this year, to all-gas appliance and equipment distribution.

Carter Mullaly, president of the company, reported that sales of the firm for May were 185 per cent over sales of the same month last year. He attributed most of this increase to concentration exclusively upon distribution and sale of gas appliances and equipment.

■ ■

Sewage Sludge Gas Engines Help Clean Up N. Y. Harbor

Among equipment units purchased by New York City recently have been four Worthington internal combustion engines which operate upon sewage sludge gas, every one directly connected to rotary blowers. Previously used sewage sludge gas engines have been designed for electric power generation. Two of the present engines are of 845 hp. and two of 460 hp.

There are also four smaller Worthington engines which, through a system of gears, drive raw sewage pumps. All pumps are being used in the New York harbor cleanup program at the plants on Coney, Ward's and Tallman's Islands.

■ ■

Louisiana-Nevada Co. Will Transport Gas to Arkansas

The Louisiana-Nevada Transit Co. has been authorized by the Federal Power Commission to construct and operate facilities for the transportation of natural gas from the Cotton Valley field in Webster Parish, La., to Okay, Howard County, Ark., and to Hope, Ark.

The terms of the certificate provide that, when the need arises, the applicant company shall furnish natural gas to the communities of Saratoga, Fulton, McNabor and Bradley, all in Arkansas.

■ ■

St. Francisville, La., Receives Natural Gas for First Time

At a cost of $57,820, workmen completed during the last week of June a natural gas transmission and distribution system for St. Francisville, La.

The transmission line is 12 miles long and the complete distribution system is 11 miles long. The system connects at Lindsay, La., the point of origin of the transmission line.

'Better Copy Contest' Awards Announced by P.U.A.A.

WINNERS of awards in the 1939 Better Copy Contest were announced by the Public Utilities Advertising Association at its annual convention held in New York, June 18-22. Results of the classes open to gas companies are as follows:

Load Building Newspaper Advertising for Gas Companies—premier award to Public Service Co. of Indiana, Indianapolis, Ind.; awards of merit to Peoples Gas Light and Coke Co., Chicago, Ill.; Washington (D. C.) Gas Light Co.; New York Power & Light Corp., Albany.

Merchandise Newspaper Advertising for Gas Companies—premier award to Lone Star Gas Co., Dallas, Tex.; awards of merit to Pacific Gas and Electric Co., San Francisco, Calif.; Jersey Central Power and Light Co., Asbury Park, N. J.; Westchester Lighting Co.; Cincinnati Gas and Electric Co.

Employe Magazines—premier award to Philadelphia Co., Pittsburgh, Pa.; awards of merit to Consolidated Edison Co. of New York; Nebraska Power Co.

Employe Newspapers—premier award to Cincinnati Gas and Electric Co.; awards of merit to Georgia Power Co., Atlanta; Public Service Corp. of New Jersey, Newark.

Gas Window or Inside Display—premier award to Washington (D. C.) Gas Light Co.; awards of merit to Central New York Power Corp., Buffalo; Philadelphia (Pa.) Gas Works Co.

Poster Advertising of All Types—premier award to Public Service Co. of Colorado, Denver; awards of merit to Consolidated Edison Co. of New York; Peoples Gas Light and Coke Co., Chicago.

Radio Rdvertising—premier award to Consolidated Ediso Co. of New York.

Motion Pictures for Public Presentation—premier award to Public Service Electric and Gas Co., Newark, N. J.; award of merit to Consumers Power Co., Jackson, Mich.; special award to Pacific Gas and Electric Co., San Francisco.

■ ■

Fall Radio Program Will Help Dealers Sell CP Ranges

The Association of Gas Appliance and Equipment Manufacturers has announced that a 13-week, nation-wide radio program, featuring the "Save While You Cook" theme, will be broadcast in 100 key cities, beginning Sept. 1, to promote CP gas ranges.

The prime objective is to make local sales outlets conscious of the large gas range market, due to the fact that there are said to be between eight and nine million obsolete cooking appliances still in use in this country.

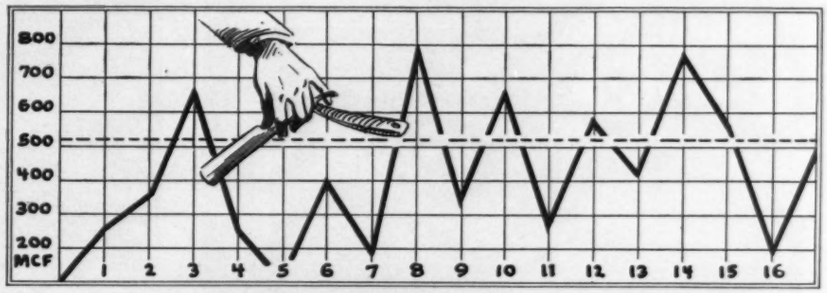
Emphasis will be placed on the value of CP ranges for time saving, food saving and fuel saving.

■ ■

Community Natural Builds

The Community Natural Gas Co., Dallas, has started construction on two new office buildings in Texas cities, one at Bryan and the other at Cleburne. The company will soon occupy a new office in Athens. The company building at Sherman was opened in June.

PEAK SHAVING



means MONEY SAVING

Butane or Propane, used in **water gas machines** for high B.t.u. gas production, will simplify your peak shaving problems and deliver greater over-all profits for your company. You get:

1. Increased set capacity
2. Reduced purification costs
3. No residual recovery problems
4. Better substitution on appliances
5. Reduced distribution expense.

Don't overlook these money saving opportunities. They may mean the difference between profitable and unprofitable operation. Our engineers will be glad to advise you. No obligation.

Philgas DEPARTMENT

PHILLIPS PETROLEUM COMPANY
GENERAL MOTORS BUILDING
DETROIT, MICHIGAN

NEW YORK
PHILADELPHIA
CHICAGO

BARTLESVILLE, OKLA.

MILWAUKEE
ST. LOUIS
AMARILLO

NATION'S LARGEST MARKETER OF LIQUEFIED PETROLEUM GASES

For POSITIVE FLOW-CONTROL of gas, oil, water, steam, and air at MINIMUM COST, specify CRANE-QUALITY valves, fittings, fabricated pipe, and piping accessories.

CRANE

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE CO., GENERAL OFFICES: 836 SOUTH MICHIGAN AVENUE, CHICAGO

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

GENERAL CONTROLS * *THE WORLD'S LARGEST MANUFACTURER of SOLENOID VALVES*

GENERAL CONTROLS
MAGNETIC GAS VALVE
« TYPE K-3B »

GREATEST RANGE OF SIZES

From ⅜" to 6" inclusive, fulfill requirements of most gas applications.

This magnetic, current failure, quiet, two-wire valve opens and closes the fuel supply line at the demand of a room thermostat or similar device. Its packless design, reliability, simplicity and low cost of operation has given this valve universal acceptance controlling gas to warm air furnaces, gas-fired boilers, industrial furnaces, conversion burners and other applications. Available in the widest ranges of sizes from ⅜" to 6" inclusive, for practically any commercial electric current, including low voltage. Write for descriptive catalog today.

GENERAL CONTROLS

450 East Ohio Street
Chicago, Ill.

267 5th Avenue
New York City

BUTANE-PROPANE *News*

THE CLEARING HOUSE FOR NEWS AND INFORMATION ABOUT . . .

Transportation and Storage
Safety Practices
Industrial and Standby Uses
Bottled Gas Distribution
Semi-Bulk Distribution
Dealer Sales and Service
New Appliances and Equipment
Internal Combustion Engines
Town-Plant Operation and Load Building
Etc., Etc., Etc., Etc.

BUTANE-PROPANE News
810 South Spring Street, Los Angeles, Calif. _____ 1939
Please enter my name as a subscriber to BUTANE-PROPANE News.
Checked enclosed_____
Send bill to:

Name_____ Position_____

Company_____

_____
Street City State

SUBSCRIPTION RATES—United States, Canada, Mexico, Cuba, South and Central American Countries, three years for $2.50. All other countries, $3.00 per year.

Ralph R. Willis Petitions F. P. C. for Natural Gas Permit

AT an expected cost of $40,000, Ralph R. Willis, Lawrenceville, Ind., will construct a 6-in. natural gas pipe line for a distance of nine miles between the gas fields of Lawrence County, Ill., to Vincennes, Ind., if his recent application to that effect is granted by the Federal Power Commission.

The proposed project will sell natural gas to the Hoosier Gas Corp. for distribution to consumers in Vincennes, Washington and Princeton, Ind., and surrounding districts, the present supply from the Kentucky Natural Gas Corp. being less than needed and the Hoosier Gas Corp. being privileged by its contract to buy elsewhere for any needs above the agreed minimum of 350,000 cu. ft. per day.

Large industrial market demands of the Hoosier company will be served by the new gas, if obtained.

■ ■

Utilities To Aid Oklahoma Dealers in Fall Campaigns

Gas utilities in Oklahoma are planning to assist distributors and dealers to put on special campaigns for sale of gas floor furnaces and space and water heaters during the late summer and early fall.

Total sales of gas appliances in Oklahoma have shown substantial increase since last fall, appliance dealers report. An example, cited by officials of the Oklahoma Natural Gas Co., reveals that in the Oklahoma City division of that company an increase of 70 per cent was shown in the sales of Electrolux gas refrigerators. These sales have been made by dealers, as public utilities cannot engage in equipment and appliance merchandising under Oklahoma laws.

■ ■

Changeover to Natural Gas For "Twin City of Bristol"

Natural gas has been substituted for manufactured gas by the East Tennessee Light & Power Co. for the "twin city of Bristol," divided into two municipalities by the Tennesee-Virginia state line. The natural gas comes from a field in southwest Virginia, 10 miles away, and Bristol is the only city being served.

The changeover was completed in June, following 47 years of manufactured gas service, according to Paul B. Winchel, gas superintendent for the company. The territory to be served has a present population of about 25,000.

■ ■

Changeover To Natural Gas Made in Globe, Ariz.

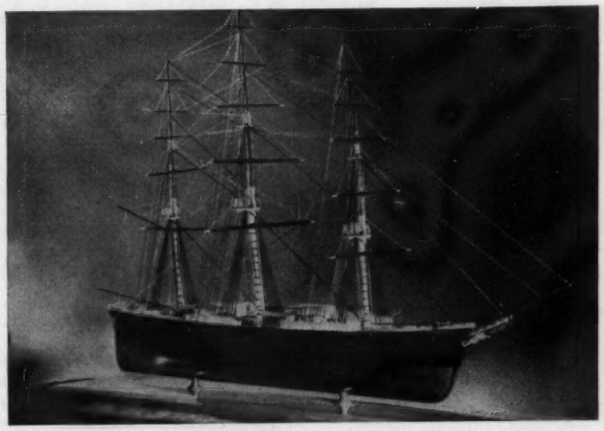
Natural gas was turned into the mains in Globe, Ariz., early in July, it has been reported by H. H. Idle, Globe manager of the Arizona Edison Co., distributor of the gas.

Alterations in the distribution system, necessitated by the changeover from manufactured to natural gas, were made at an approximate cost of $40,000. Consumers' appliances were changed without charge to patrons.

■ ■

New Okla. Gas Pool Opened

A new Wilcox gas pool apparently has been opened by R. A. Freeman and J. S. Fleming, both of Tulsa, in No. 1 Frank Little ranch well north of Vera and South of Ramona in Southern Washington County, Okla. The well on test produced 2,500,000 cu. ft. of gas per day at a depth of 2015 ft.



Scale models of "The Flying Cloud," famed clipper ship that made an 89-day voyage, New York to San Francisco around the Horn, in 1851, were awarded to the companies with the highest sales records in the 1939 "Man-the-Sales" Contest conducted by the A.G.A. Refrigeration Committee.

Clipper Ships Awarded Utility Winners in "Man-the-Sales" Contest

SHIP models of "The Flying Cloud" and substantial sums of money, the trophies and prizes offered in the 1939 American Gas Association refrigeration committee's "Man-the-Sales" Spring and Summer gas refrigeration selling campaign, have been awarded to 39 leading utilities which made the highest sales records in their various divisions during April, May and June, according to an announcement by R. J. Rutherford, vice president of the Worcester (Mass.) Gas Light Co., chairman of the committee. As in previous years, Servel, Inc., sponsored the contest through the Association of Gas Appliance and Equipment Manufacturers, and the sale was stimulated by an advertising drive directed by H. S. Boyle.

More than 600 utilities participated in the contest and the volume of gas refrigerators sold during the 1939 campaign was 33 per cent greater than in 1938. Vital factors contributing to the success of the campaign were the fields available in the replacement market, the old-fashioned ice box market, and that of new homes and apartments.

There were three classifications upon which awards were made, namely, (1) for the greatest total number of gas refrigerator sales in April, May, and June; (2) for the greatest number of sales per 1000 meters; and in some cases, (3) for a greater sales record in 1939 than in 1938. The winners of clipper ship models in their respective divisions were:

Division 1: Consolidated Edison Co., New York; Washington (D. C.) Gas Light Co.; Philadelphia (Pa.) Gas Works Co.; Brooklyn (N. Y.) Union Gas Co.; Southern California Gas Co., Los Angeles, and Michigan Consolidated Gas Co., of Detroit.

Division 2: Providence (R. I.) Gas Co.; Brooklyn Borough Gas Co., Coney Island, N. Y.; New Haven (Conn.) Gas Co.; Springfield (Mass.) Gas Co.; Hartford (Conn.) Gas Co.; Harrisburg (Pa.) Gas Co.; Worcester (Mass.) Gas Light Co.; Laclede Gas Light Co., St. Louis, Mo., and the Consolidated Gas and Electric Light and Power Co., Baltimore, Md.

Division 3: Florida Public Service Co., of Orlando; Alexandria (Va.) Gas Co.; Metropolitan Edison Co., Easton, Pa.; Roanoke (Va.) Gas Light Co.; New Jersey Light and Power Co., Easton, Pa.; Central Illinois Light Co., Springfield, Ill.; Ottumwa (Iowa) Gas Co., and the Central Indiana Gas Co., Muncie, Ind.

Division 4: Ohio Fuel Gas Co., Columbus; Michigan Consolidated Gas Co., Grand Rapids; Peoples Gas Co., Port Arthur, Texas; Texas Public Service Co., Austin; Manufacturers Light and Heat Co., New Castle, Pa., and the Montana-Dakota Utilities Co., of Minneapolis, Minn.

Division 5: North Penn Gas Co., Port Allegheny, Pa.; Macon (Ga.) Gas Co.; Natural Gas Company of West Virginia (Alliance, Ohio); Ohio Fuel Gas Co. (Athens, Ohio, Branch); the Manufacturers Light and Heat Co., East Liverpool, Ohio; Ohio Fuel Gas Co., Elyria, Ohio (Lorain Branch), and Manufacturers Light and Heat Co., Washington, Pa.

Division 6: Tex-Mex Natural Gas Co., Houston, Texas; Virginia Gas Distribution Corp., Staunton, Va., and Virginia Gas Distribution Corp., of Lexington, Va.

■ ■

Montana-Dakota Utilities Co. Quits Importation of Canadian Gas

The Montana-Dakota Utilities Co., Minneapolis, Minn., has been given permission by the Federal Power Commission to withdraw its application to import natural gas from Canada. The Montana-Dakota company has been importing gas from the Rogers-Imperial Dome gas field in Canada since November, 1938, under a temporary authorization.

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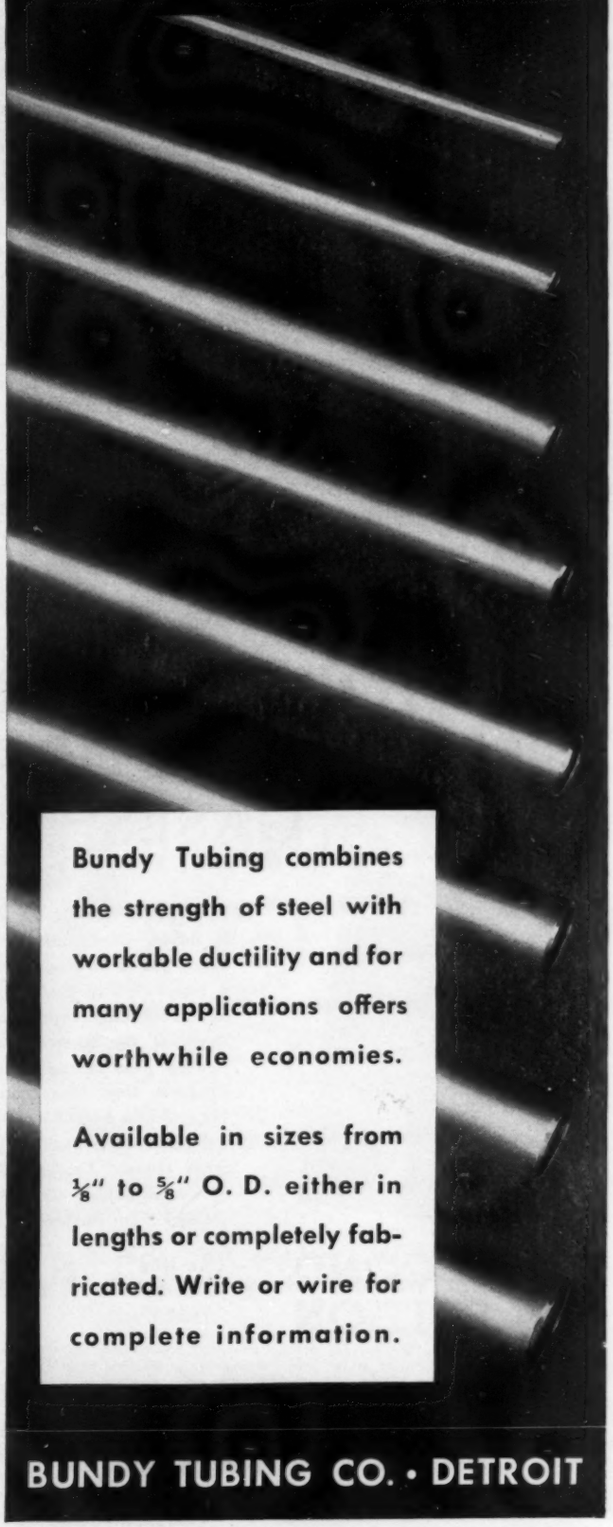

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CURRENT Reading

• **IN THIS DEPARTMENT, GAS presents to its readers résumés of recently published articles, papers, bulletins, and books dealing with the progress made by the industry in engineering, utilization, load-building, and management. This column will be a monthly feature in GAS.**

The Case for Experience Rating in Unemployment Compensation and a Proposed Method—Herman Feldman and Donald Smith. Published by Industrial Relations Counselors, Inc., New York City (price $1.00). Sixty-six pages including tables.

Employers who provide steady and continuous employment, the authors believe, should be rewarded with lower contributions to the unemployment benefit funds of the state than employers whose employment record is irregular, seasonal or spasmodic. The lower contributions will, in themselves, prove an incentive to all employers to regularize their work, smooth out peaks and valleys of unemployment and tend toward industrial stability. The authors present a number of other methods of stabilizing and regularizing employment, propose a reserve-ratio basis of calculating experience rating and contributions to benefit fund; proposal said to combine all the desirable features of simplicity, incentive to stable employment, assessments on employer made on merit basis and provision for adequate reserves in benefit funds. A thorough study of a complex problem in modern economics.

Handbook of Chemistry and Physics—23rd Edition—edited by Charles D. Hodgman, associate professor of physics at Case School of Applied Science, published by the Chemical Rubber Publishing Co., Cleveland, Ohio, (price, $3.50).

The contents of the Handbook's 2221 pages are divided into 308 pages of mathematical tables and formulas; 200 pages of general chemical tables; and chapters on properties and physical constants, specific gravity and properties of matter, heat, hygrometric and barometric tables, sound, electricity and magnetism, light, and quantities and units.

In this edition of the Handbook the table on physical constants of inorganic and metal-organic compounds has been completely revised and reset; considerable space has been devoted to spectrum analysis and a table on X-ray crystallographic data; and several new features have been added, including tables on the melting point index and the boiling point index of organic compounds, potentials of electrochemical reactions, free energy, and ionization potentials.

Accident Rates in the Public Utility Industries—National Safety Council, Inc., Chicago, Ill. This statistical report shows the predominant causes of accidents in the utility industry and what companies made the best records.

Annual Statistical Report of the American Iron and Steel Institute—American Iron and Steel Institute, New York City (price $5.00). Tables only, 104 pages. Statistics of the iron and steel industry of the United States and Canada for 1938 including compilations by states and regions of production, exports, imports, shipments and prices. Comparable data are shown for previous years.

Controlling Quality of Pipe Welds—R. W. Breckenridge. *Heating, Piping and Air Conditioning*, June 1939, pp. 354, 355, 360. With the growth of welding of piping and pressure vessels has developed the need for ascertaining the quality of welded joints. One of the non-destructive methods evolved that is being applied to arc welded joints is that of the arcronograph.

How to Insure High Quality Pipe Welds—W. A. Duncan. *Industrial Power*, June 1939, pp. 67-70, 101, 103. Standard of welds depends on proper preparation specifications, grade of welding rod, adequacy of equipment and supervision. Also the selecting and qualifying of operators is important, these factors being described in detail.

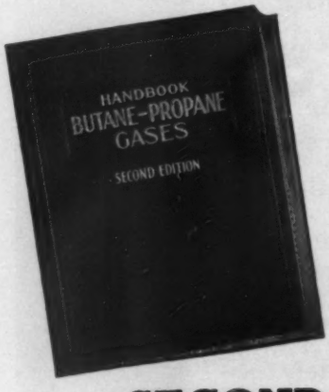
Detecting Pipe Line Corrosion with Electrical Instruments—O. C. Mudd. *Oil and Gas Journal*, June 15, 1939, pp. 48, 51, 54, 59. Author discusses the causes and effects of external corrosion of buried pipe lines, and how corroding sections can be detected before leaks occur, by the use of special electrical equipment. Much of such corrosion can be attributed to the different concentrations of individual chemicals through which the line passes, these differences being the principal cause of electric current flow on pipe lines.

Injection of Ammonia Vapor Reduces Hydrate Ice in London Gas Lines—*Oil Weekly*, June 5, 1939, pp. 92, 93. Describes the injection of ammonia vapor in the gas lines of Carter Oil Company.

A Modified Buret for Microanalysis of Gases—David C. Grahame. *Industrial and Engineering Chemistry*, Analytical Ed., June 15, 1939, pp. 351. A modification of the Blacet-Leighton gas microburet is described. The mercury threads are easily adjusted and do not drift from their set positions. Corrections for pressure are not ordinarily required. The buret may be cleaned without dismantling.

HANDBOOK
BUTANE-PROPANE
GASES

415 Pages



CONTENTS: Semi-Bulk Distribution: Use of Butane in Buses: Combination Propane Operated Utility Plant: Use in Internal Combustion Engines: Design & Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economical Comparisons with Coal, Oil, Electricity, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Special Uses: Volume Correction Factors: Transportation: Use with other Gases: Analysis & Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

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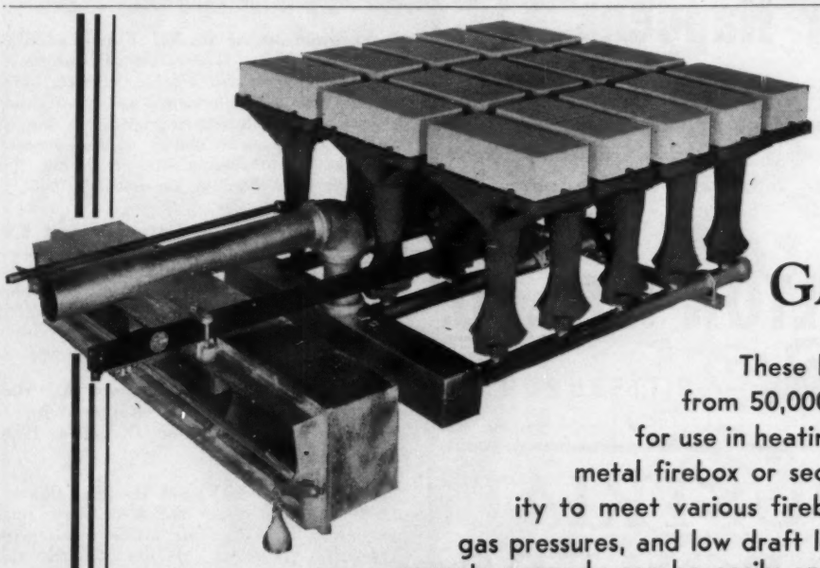

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F. J. Evans Engineering Co., Birmingham and Atlanta

Gas & Heating Specialty Co., Dallas Mechanical Equipment Co., Houston Frank P. Fischer Engineering Co., New Orleans

Radio Improves Pipe Line Company's Communication Facilities—W. T. Bulla. *Oil and Gas Journal*, May 25, 1939, pp. 57, 58. The use of radio during emergency conditions occurring in the course of pipe line operation is discussed with the object of showing the possibilities of this means of communication.

Time and Cost Reduced by Pipe Line Anticipator—*World Petroleum*, April 1939, pp. 38-41. Description of electrical device developed which locates pipe lines automatically while excavating and warns operator of approach to unmapped cables and other obstructions.

Revised Method of Testing Gasoline Content of Gas—*Oil and Gas Journal*, May 4, 1939, pp. 52, 68. The board of directors of the Natural Gasoline Association of America recently adopted a new code for determining the gasoline content of natural gas by the compression method. The new method is a revision of that portion of Code 101, a joint standard of the N.G.A.A. and the A.G.A. adopted February 1, 1933. Procedure and testing apparatus are described.

Measurement and Regulation of Production from Unusually High Pressure Gas Wells—J. J. Carter and C. E. Webber, *Oil Weekly*, May 15, 1939, pp. 16-18, 20, 22, 24. The measurement of high-pressure gas will be discussed in two parts in this article. The first part will deal with the measurement of a dry gas which, if subjected to moderate changes in temperature and pressure, will still remain a gas. The second part will consider the measurement of a wet gas which carries some entrained liquid and would yield a distillate upon reductions of temperature and pressure. Also in *Refiner*, May.

Personnel of Natural Gas Pipe Lines—*Oil and Gas Journal*, May 11, 1939, pp. 81, etc.

California Gas Fields Opening New Epoch—L. P. Stockman. *Oil and Gas Journal*, May 4, 1939, pp. 24, 25, 137. As a result of the expansion of natural gas markets and the resulting search for gas fields, prospectors found eight commercial gas fields. Natural gas has come into such general use throughout California for domestic consumption and utilization in various manufacturing industries that it is an important factor contributing to the general economic status of the Pacific Coast.

California is Busily Searching for Natural Gas Reserves—L. P. Stockman, *Oil and Gas Journal*, May 25, 1939, pp. 36, 37, 114. Description of natural gas fields in California.

Internal Combustion Engine Heat Flow to Cooling Water Analyzed.—C. J. Vogt. *California Oil World*, 2nd May issue, 1939, pp. 17, 18, 20. In spite of the seemingly large number of assumptions necessary for an analysis of the heat flow to the cooling water, calculated values are in good agreement with test results.

Combating Corrosion In Industrial Process Piping—L. G. Vande Bogart, Assistant Chief Chemist, Works Laboratory, Crane Company. Technical Paper No. 408, May, 1939.

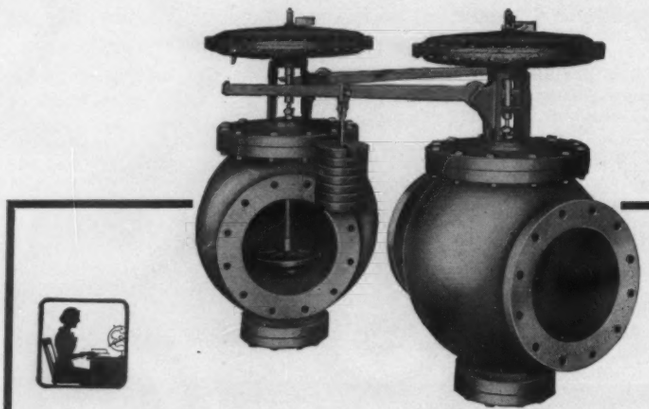
Application of Radial Flow Calculations to Gas Recycling Problems—Laurence S. Reid. *Oil Weekly*, June 26, 1939, pp. 17, 18, 20. The return of dry residue gas to the producing formation is one of the most important phases of the general problem of processing and recycling the reservoir fluid from a gas-distillate pool.

Need for Fouling Data on Heat Exchangers—W. L. Nelson. *Oil and Gas Journal*, Feb. 2, 1938, p. 40. Tabulation of commercial exchangers disclosed discrepancies existing between the computed and actual transfer data. This indicates that a closer study of applied heat transfer is necessary.

Safety Code for Compressed Air Machinery and Equipment—Approved American Standards Association, December, 1938. (ASA B19-1938.)

High Pressure Vessel Design—Charles O. Brown. *Chemistry and Metallurgy*, June 1939, pp. 353-355. This article deals with pressure equipment of the welded and forged type, omitting riveted vessels.

Fatigue of Metals—Developments in the United States—H. F. Moore. *Metals and Alloys*, June 1939, pp. 180-183. Author discusses effect of "stress raisers," fatigue damage by occasional overstress, detection of early stage of fatigue crack, effect of chemical composition, metallography and mechanical properties, study of fatigue failure by x-ray diffraction, endurance limit and cycles of stress, speed of stress travel and fatigue strength, desirability of perfectly elastic metals, fatigue testing in special fields.



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Oklahoma Natural Conducts Unusual Sales Contest

THE Oklahoma Natural Gas Co., Tulsa, during July, stimulated summer sales of gas to new customers by conducting a contest in which a live billy goat played a prominent part.

Each district of the company was assigned a quota to be reached through sales of gas service to new customers by employes. Prizes and bonuses were given to employes for new customers whom they had personally contacted.

To the district manager whose district showed the lowest percentage of quota for any given week was shipped "Mr. William Goat, Jr." The goat was delivered directly to the district manager's office and he was made responsible for the care of the animal until his district worked out of low place. The goat was then shipped on to the district manager who showed the lowest percentage of quota on new customers for the succeeding week.

The Oklahoma Natural Gas Co. is planning to cooperate with distributors and dealers of gas equipment and appliances in staging a gas floor furnace and automatic gas water heater sales campaign beginning around September 1 and continuing for about six weeks. Quotas and bonuses will be assigned and substantial prizes offered to employes of distributors and dealers making their quotas. While gas company employes will not engage in actual selling because of an Oklahoma law prohibiting public utilities from merchandising equipment and appliances, they will be encouraged to turn in prospects to dealers and these will count on quotas of the utility employes.

The gas utility also will cooperate by displaying various lines of equipment and appliances on its display floors in all towns which it serves in Oklahoma and in devoting special advertising space toward creating a demand for floor furnaces and automatic hot water heaters.

■ ■

F. H. Winslow on Program of So. Calif. Meter Ass'n.

"Rotary Displacement Meters as Applied to Gas Measurement" was the subject of a paper read by F. H. Winslow, of the Southern Counties Gas Co., at the July meeting of the Southern California Meter Association. It was illustrated with colored slides showing the impeller design and the course of the gas in its progress through the meter. George Forster of the Texas Co., newly-elected president of the Association, conducted the meeting.

■ ■

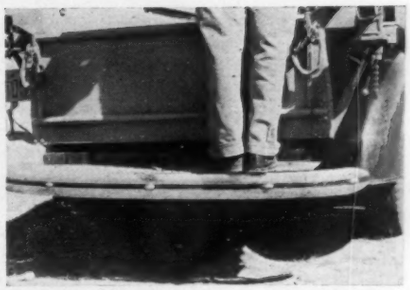
New Extension Gas Mains Being Laid in Chandler, Ariz.

Work was scheduled to start early in July on the laying of new gas mains in Chandler, Ariz., which will total approximately 6400 ft. and will cost about $6000. This is an extension of the present system, owned by the Central Arizona Light and Power Co., and when completed will be ready to serve a new area of the city that contains 150 houses.

■ ■

Safety-Tread Plate Improves Service Truck Bumper Step

Light pick-up trucks serve the gas industry widely in installation and maintenance work, with the body of the truck equipped to function as storehouse and workshop combined. In almost every case access to the working portion of the truck is from the rear, the back bumper being used as step and operator's "platform."



This safety-tread addition to the service car's bumper enables faster work, reduces accidents, eliminates breakage.

The United Gas Co., in its Longview, Texas, operations, improves this working step by welding a shaped section of safety stair tread (steel) to the bumper brackets on a level with the top edge of the curved bumper bar, but separated therefrom by a gap of about one inch. This gap allows the bumper to absorb minor shocks without striking the step, and also serves as shoe scraper to prevent the accumulation of mud on the corrugated steel standing.

Thus providing the service man with a firm footing, the company enables him to center his entire attention on the work in hand without wobbling, balancing precariously, or risking falls when handling fragile equipment.

All Kitson products are stamped K-CO. Ask for this brand, it is your guarantee of highest quality in brass fittings.

G-203 Tee Head Standard Gas Stop

WHEN every effort is being made to keep service and maintenance expense as low as possible, it is sound economy to use initially the best quality equipment—especially when it costs no more. That is why so many gas operating men swear by K-CO products. Their quality keeps operating expenses down to a minimum. Write for our latest catalogue and price list.

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Blaw-Knox Co., Pittsburgh, Pa.
Model: Type K Gas Cleaner.
Description: Designed for use in servicing small industrial consumers, apartment houses, hotels, restaurants, district regulators and stations at the borders of small cities or towns, the cleaner removes dust, pipe scale and condensates from the gas before the fuel enters the meter or regulator.

The new cleaners will be furnished in two sizes and three pressure ranges. The K-6 size will deliver gas at a capacity of 6000 cu. ft. per hour at a 14 in. water pressure, while the other size will handle 15,000 at the same pressure. As to pressure, one group will accommodate up to 50 lbs., another up to 230, and a third group up to 500 lbs. Pressure loss is held to 1 in. water drop on service up to 8 oz. gage pressure.

The outer enclosure is a welded vessel with a bolted removable top. The cleaning element is contained within an inner shell which is suspended from the cover plate. This contains the necessary contactor tubes, separating devices and other parts required for the gas conditioning. The design incorporates the oil bath and Blaw-Knox contactors for scrubbing the gas, similar in this respect to the process on the bulk size cleaners, but introduces a new liquid separator of the contact surface type.

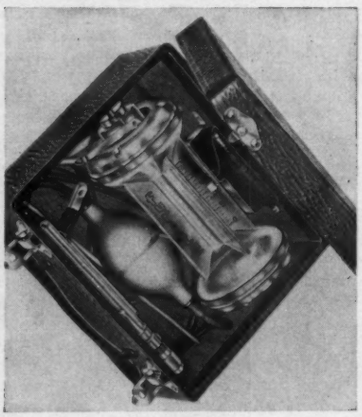
■ ■

Floor Furnace Valve

Milwaukee Gas Specialty Co., Milwaukee, Wis.
Model: No. 721 Baso Floor Furnace Gas Valve.
Description: A combination of a Baso valve, a main burner valve, and a pilot valve. Controls gas flow to floor furnaces, and can be actuated to its open operating position only when the burner valve is in the closed position. A positive interlock prevents resetting or opening of the Baso valve when the burner valve is in the open position. This interlock also prevents the opening of the burner valve while resetting the Baso valve. This model is available in either a straight or an angle valve model with a wide variety of inlet and outlet sizes.

Hotstream CO_2 Analyzer

The Hotstream Heater Co., Cleveland, Ohio.
Description: A complete kit, consisting of a vest pocket draft gage, or small CO_2 analyzer and stack thermometer that can be used and operated by anyone working with oil, gas or coal-burning heating appliances. It is free of valves, clamps or leveling bottle. The CO_2 sample is pumped into gas chamber through an aspirator bulb, the sampling hose is detached, which seals the unit, and the gas is mixed with the absorption fluid by turning unit upside down. When returned to normal position, the suction created by the absorbed CO_2 pulls the



fluid into a graduated tube which indicates the percentage of volume absorbed. The result is to make it easy to obtain the proper combustion that will comply with the new F. H. A. housing regulations.

■ ■

Community Natural To Have New Building in Bryan

A new office building for the Community Natural Gas Co. at Bryan, Texas, is under construction, and will be finished around August 31, it was announced recently by M. E. Adams, local manager.

The new one-story building will contain a 30x43-ft. display floor with windows, two private offices and a large warehouse which will accommodate service cars. A forced warm air central heating plant with blower for air circulation, filters to eliminate dust, and automatic humidifier are being installed. Parking space for customers is also being provided.

Community Natural has also begun construction of a new office building at Cleburne, Texas, and will soon occupy a new office in Athens. Their building at Sherman was opened in June.

■ ■

P. G. and E. Pipes Natural Gas To Lincoln, Calif.

Lincoln, Calif., received its first natural gas on July 5. The fuel is being piped to Lincoln from the Marysville area by the Pacific Gas and Electric Co. and the project was installed at a cost of approximately $25,000.

■ ■

Harold Hone Passes

Harold Hone, for 28 years with the Consolidated Gas Co. and the Consolidated Edison Co., passed away recently at his Flushing, Long Island, home. At the time of his death he was gas engineer at the New York World's Fair for the Consolidated Edison Co. He was 57 years of age.

MUELLER'S exclusive nationally advertised Heat Levelizer for Gas Furnaces makes sales easier and profits bigger for you.

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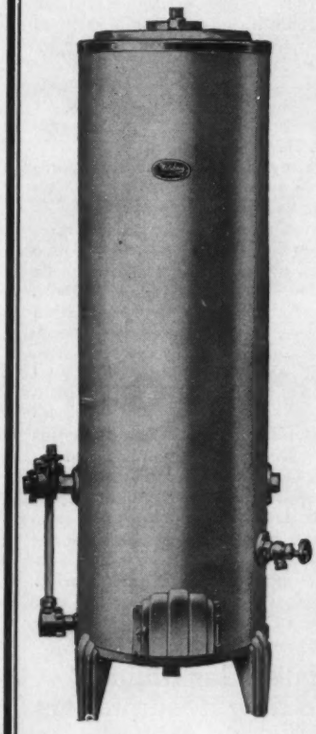

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Reynolds Toggle Type Regulator *with long removable spring* offers extreme sensitivity and makes an ideal control for small district or industrial installations.

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Anderson, Indiana, U. S. A.

GAS CONTROL SINCE 1892

Method for Keeping Utility Fixed Property Records

AN original method of keeping fixed property records, which has aided materially in obtaining quick and accurate information regarding units of property, value and location, has been worked out by the Consolidated Gas Utilities Corp., Oklahoma City, Okla.

The method has attracted considerable attention from other gas utilities, according to O. E. McMannis, accountant in charge of the company's fixed property records. A separate record is kept for each plant or system in accordance with the Oklahoma account classification. The company has found that it is impractical to write a legal description in its property ledger for each unit of property due to the space required, and constant changing of equipment and location. The company, therefore, has successfully adopted the use of plat maps in connection with its property ledger.

Each plat is drawn to represent a township; also to show the school district and political township boundaries. All main production and transmission pipe lines are assigned line numbers and each lateral line carries that number with a symbol. Units of property installed on, or in connection with, any line or lateral, are assigned inventory numbers. This enables the company to determine the value of any line and all equipment used in connection with it.

Mr. McMannis said that the numbering of units of property has a definite value, since this system eliminates misunderstanding between the field and general office when changes, replacements or retirements are made to the units of property.

The fixed property records system of the company has been in satisfactory operation for approximately three years. The record is compact and inexpensive to keep. Any information desired can be obtained in a comparatively short time. It is essential in preparing numerous ad valorem tax returns, annual commission reports, and many other classes of reports, Mr. McMannis stated.

The Chemistry Building at West Virginia University where the general meetings and some of the classes will be held.

Appalachian Short Course Program Plans Announced

H. J. WAGNER, senior natural gas engineer, the Public Service Commission of West Virginia and chairman of the meter school committee, has announced that all is in readiness for this year's Appalachian Gas Measurement Short Course, to be held at the University of West Virginia in Morgantown, August 21, 22 and 23.

General meetings will be held in the morning on Monday and Tuesday, at which time those present will be addressed by recognized authorities on various economic phases of gas measurement and control. These speakers include Dr. C. E. Lawall, acting president of the University; W. A. Wallace, Jr., president of the Oil and Gas Association of West Virginia; George E. Welker, president, United Natural Gas Co.; C. C. Phillips, superintendent of transmission, Ohio Fuel Gas Co.; B. L. Maulsby, manager, Lynchburg Gas Co.; A. M. Hutchinson, superintendent of gas measurement, Ohio Fuel Gas Co.; and C. C. Reed, general superintendent, Hope Natural Gas Co.

Classroom sessions will be conducted afternoons and all day Wednesday by gas company engineers and representatives of the equipment manufacturers. A variety of subjects will be offered during each period. Repeat classes are scheduled to take care of conflictions in interest.

■ ■

Consolidated Gas Utilities Moves To New Headquarters

The Consolidated Gas Utilities Corp. has removed its headquarters offices in Oklahoma City from the Hales Building to the tenth floor of the Braniff Building.

Chief purposes of the move were to secure more space and place all the offices on the same floor. The offices cover 5800 ft. of floor space and occupy the entire tenth floor. Among the new features is a large, modernly equipped map and drafting room.

■ ■

Citizens Utility Adds to Home Service Department

The Citizens Gas and Coke Utility, Indianapolis, Ind., has recently added Mary Hudson and Josephine Mercer to its home service staff. Miss Hudson was graduated from the home economics department of Purdue University, and Miss Mercer, a home economics school teacher, is working only during the summer months.

Get Faster Soft-Metal Melting at Lower Cost with a Johnson 300 Furnace!

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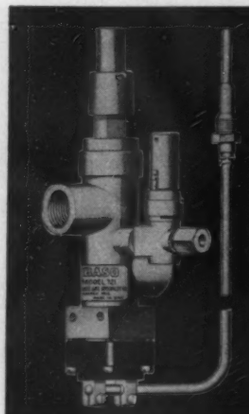

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ECONOMY. In service lines where dust troubles exist, the valve in Type "H" and "K" Regulators may be changed and the dust can be blown out without removing the Regulator from the line.

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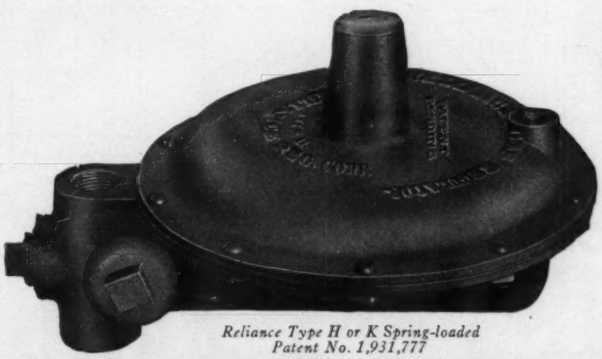
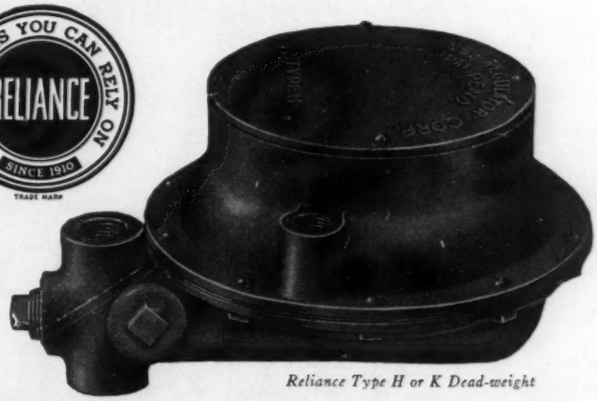


Reliance Type H or K Spring-loaded Patent No. 1,931,777



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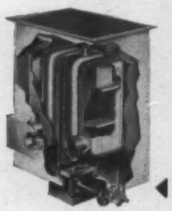

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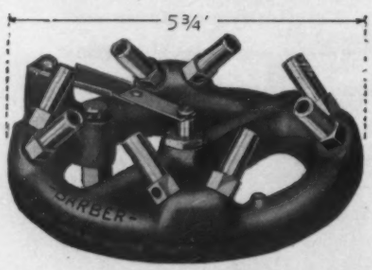

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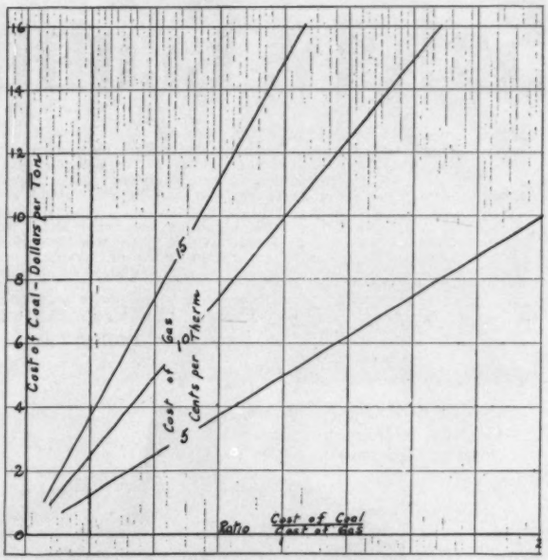

FIG. 2.

Tentative comparative operating costs for space heating by coal stoves and fan circulating gas cabinet heaters.

A Problem in Heating

(Continued from Page 23)

sons for these economies are partly psychological and partly engineering. The engineering features which make for the economy of this type of heating are: (1) the use of the jacket loss from the heater for heating the rooms, (2) the elimination of starting and piping loss which are present in every central fired system, (3) the reduction in flue loss, and (4) the complete circulation of air which reduces air stratification between rooms. However, of equal importance is the fact that the customer heats in accordance with his desire. In many homes it had been the practice to air the bedrooms in the morning and close the doors between these rooms and the rest of the home. Obviously, with such an installation the heater is called upon to heat the space with which it is in proximity. In the case of a central-fired installation in the early morning the thermostat is calling for heat and these rooms with the windows wide open are dissipating a great deal of the heat delivered through the central heating system. To save fuel by unusual household practices, many customers are unwilling to change their daily routines.

It cannot be said that heating by fan circulating cabinet heaters is absolutely perfect. There are certain drawbacks, but these are in no way serious detriments either to the salesman who is aware of them or to the customer who is interested in the more modern and more economical methods of heating. While it is very early to give actual data on which to base estimates of operating costs, it has been found practical to use the records of those customers who have passed through one or more heating seasons in comparison with the prospect's home. On the basis of the data previously given and also direct comparisons in several of the homes, it has been possible to compare the operating costs with the costs of coal used in parlor stoves and oil in portable heaters and in the kitchen range. As a preliminary comparison the data indicates that 530 B.t.u. gas at 10 cents per therm (53 cents per M c.f.) is equivalent in operating cost to hard coal at $10 per ton. The chart, Fig. 2, gives different comparisons but must be considered as absolutely tentative until more definite information resulting from a good many more installations is at hand.

In summary it can be said without doubt or fear of contradiction that there is no market open to the utility gas companies' sales managers today which offer the benefits for greater merchandise sales or increase of gross and net revenue than do fan circulated direct fired gas heaters for residences.

■ ■

Gas Service at Ventura, Iowa

Natural gas was recently turned into the new distribution system at Ventura, Iowa, by the Peoples Gas and Electric Co., Mason City, Iowa, installer of the system. The event was celebrated by a ceremony in which T. L. Connor, gas superintendent of the Peoples company, turned a torch valve and Marian Skene lighted the gas which marked the beginning of gas service in Ventura.

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It isn't necessary to damage lawns and pavements by trenching in order to install pipe under ground, and it isn't necessary to go to all the expense of digging, back-filling, etc. Just use a Greenlee Hydraulic Pipe Pusher. It only requires a trench long enough for the pushing operation, and one man, standing in a comfortable position, can push the pipe where it is wanted, simply by pumping the handles.

This tool is compact, easy to handle and simple to operate. Pumping the handles sets up hydraulic pressure within the cylinders, causing the body of the pusher to travel on the notched steel base and to push the pipe through the ground. The pipe clamp is reset only when the pusher reaches the end of the base.

Because it reduces trenching to a minimum and because of its arrangement for speed, this pusher is able to save much time and labor. This has been proved many times under many different conditions. Let us tell you all about it.

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Gas Air Conditioning Serves Dallas Office Building

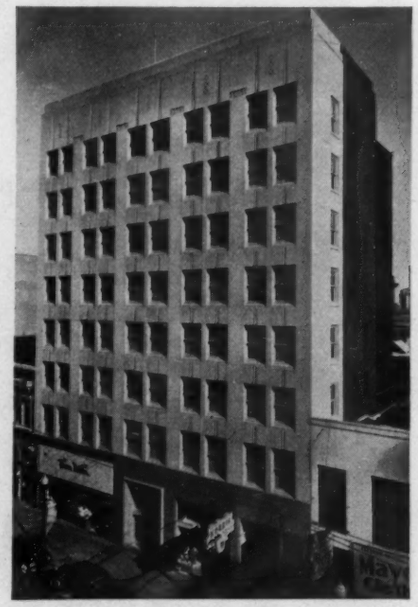
EMPHASIZING an economy in operation that may easily undercost electricity as much as 75 per cent, natural gas-powered air conditioning has given a convincing demonstration of its ability through an installation in the Great National Life building, Dallas, Texas.

The installation was completed in April but was not put into service until later. The gas consumed for the period from May 29 to June 27 was 386,000 cu. ft. and the bill amounted to $121.52 for handling 130 tons of refrigerating equipment. Included in that bill was the cost of operating a water heater, whose average monthly cost in the past has been $33. With that amount deducted, the air conditioning cost is reduced to under $90. Converting the gas consumption to its electrical equivalent, it would have required between 27,500 and 30,000 kw. hrs. to do the same work, and at the prevailing cost of electricity in Dallas would have cost from $300 to $400 to condition the building during the same given period.

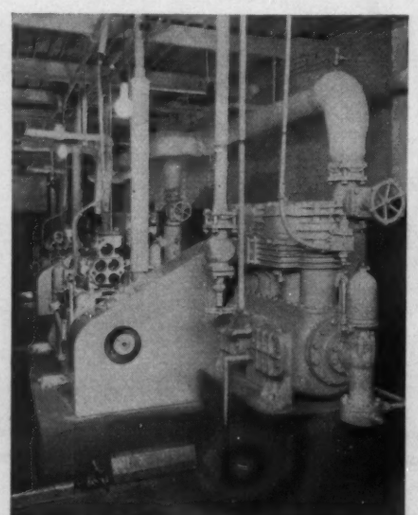
Three Carrier compressors, belt-driven by three 50-hp. Lycoming natural gas engines, furnish the necessary refrigeration to air condition the entire building. These give a maximum of flexibility at the lowest possible cost, due to the fact that speed of an internal combustion engine varies with its load, as opposed to the constant load of an electric motor.

The plant was designed with automatic controls which coordinate engine operation so that one or all three engines will operate at speeds necessary to carry the load from maximum to minimum, and when the demand decreases below the maximum efficiency point for the three engines, one engine automatically stops, the other two accelerating to take the load. The same process takes place when the load demand is below the efficiency point of two engines, and the reverse operation takes place as the opposite condition develops.

Several other Dallas buildings have been air conditioned with natural gas power, and because of its flexibility, dependability and economy, this fuel is expected to come into increasing demand for such purposes.



View of the Great National Life Building, Dallas, Texas, one of the first large structures in the Southwest territory to be air conditioned by natural gas.

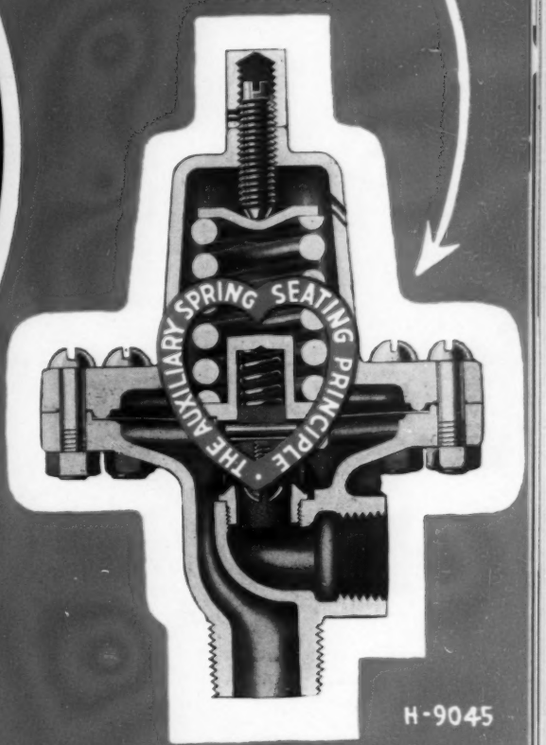


Two of the three 50-hp. gas engines which drive the three compressors furnishing 138 tons of air conditioning for the Great National Life Building.

Dietetic Habits Discussed In New Book by Rountree

The basic principles of diet with comparisons of dietetic habits of Americans and other peoples are discussed in *This Problem of Food*, by Jennie I. Rountree (Public Affairs Committee, publishers, price 10 cents). The 32-page book, illustrated with tables and drawings, reveals American inefficiencies in choice of diet resulting in lack of proper nutrition, and recommends specific diets for various occupations. In conclusion it states that "a good diet does not mean eating things we don't like."

N.B.— No other valve has this feature.



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When you are responsible for the safe operation of your customers' hot water storage system it doesn't pay to take chances by installing any but the safest relief valve obtainable—a Mueller Relief Valve.

The increased "safety factor" of a Mueller Relief Valve is due to the exclusive AUXILIARY SPRING SEATING PRINCIPLE. With this construction, it is possible to use a composition disc that is lightly seated by the action of this light Auxiliary Spring while the load of the heavy main spring is carried by stops cast into the valve body. This exclusive principle permits extreme sensitivity to varying pressures and since there is no great load being carried by the valve disc, it will not become imbedded or grooved into the valve seat and the valve will operate quickly and accurately without sticking or dripping.

In addition to the Auxiliary Spring Seating Principle, all Mueller Relief Valves have extra large monel metal diaphragms. This feature permits the pressure to be built up against a far greater area than is possible in spring loaded pop valves where pressure for opening the valve is exerted upon the seat area alone. Far more accurate control of dangerous pressures is obtainable with Mueller Relief Valves.

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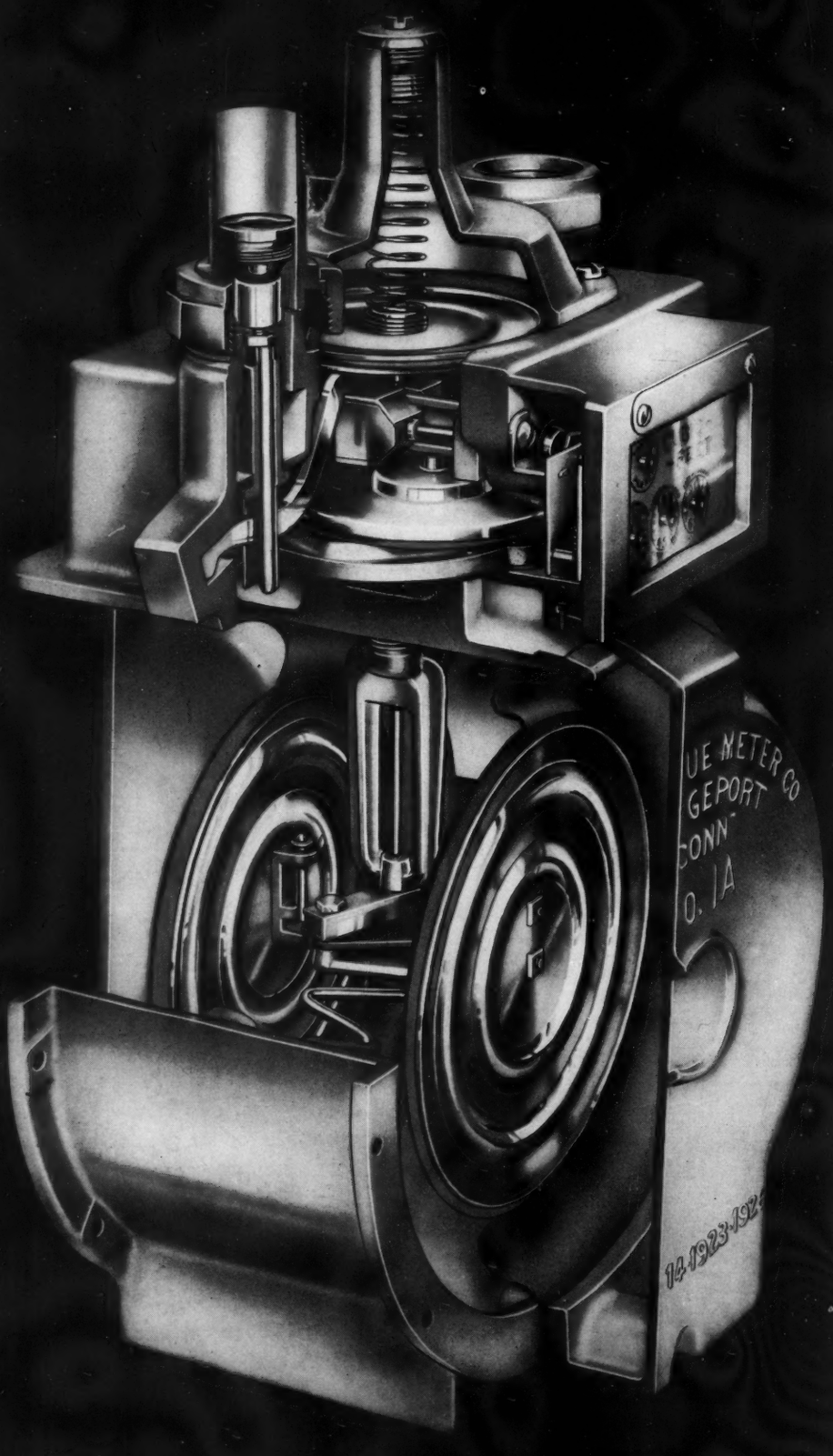

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